Arousal, Mood and Problem Gambling: Evidence for Hope as a Psychological Strength Among At-Risk Individuals

Shahriar Keshavarz

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Abstract

Although gambling is often viewed as a harmless form of entertainment activity, some individuals report significant problems associated with their gambling behaviour. Consequently, many scholars have made it their life's work to study the aetiology of problem gambling and contribute to the development of intervention and treatment programs. While decades of research indicate that the aetiology of problem gambling is complex and multi-faceted, two factors – arousal and mood – consistently emerge in the literature. However, studies investigating their effects on gambling behaviour have produced mixed results. In Chapter 2, it was hypothesised that this may be due to studies focusing on arousal and mood in isolation, neglecting possible interactions between them. Consistent with predictions, across two experiments (N = 124) it was shown that the inconsistencies reported in the gambling literature are due to studies largely examining the role of arousal and mood on gambling behaviour in isolation, neglecting possible interactions between them. Results show that as severity of negative mood increases (via increases in physiological arousal), so does gambling intensity, consonant with reports that some individuals use gambling to cope with/escape aversive states. Results also show that increases in the intensity of positive mood (via increases in arousal) decrease gambling intensity, consistent with reports that some individuals use gambling to enhance positive affect (i.e., seek increases in arousal/excitement to reach an optimal state). These findings are in line with previous reports that there are two primary subtypes of gamblers: (1) individuals who use gambling to cope with/escape aversive states (escape-seekers), and (2) those who gamble to enhance positive affect (enhancement gamblers). This highlights the need to develop specific targeted interventions which will be differentially effective across these subtypes. A look to the gambling literature indicates that escape-seekers are more vulnerable to developing problem gambling than other subtypes of gamblers, which is why it is important to develop intervention and treatment

programs that protect escape-seekers from problem gambling. Chapter 4 put the following hypothesis to the test: hope can protect at-risk individuals (i.e., individuals who gamble to escape problems and negative emotions) from problematic gambling. Across two experiments (N = 106) and one questionnaire study (N = 122) findings indicate that hope – a psychological construct rooted in Positive Psychology – can protect populations resembling escape-seekers from excessive and potentially problematic gambling. Furthermore, in Chapter 5, two exploratory studies were conducted to explore whether (a) potential predictors of hope can also make for positive intervention and prevention, and (b) hope can also aid in the recovery process. First, it was hypothesised that good quality sleep and nutritional intake are related to increased levels of hope, which is in turn related to reduced gambling severity among at-risk individuals; this hypothesis was put to the test via a questionnaire study (N = 214). Second, it was hypothesised that hope is related to help-seeking intentions among at-risk individuals; this hypothesis was put to the test via a separate questionnaire study (N = 116). Consistent with predictions, findings from these two studies reveal that (1) good quality sleep and nutritional intake can increase hope levels and hope levels can in turn reduce problem gambling severity, suggesting that predictors of hope can also make for positive intervention and prevention among at-risk populations, and (2) individuals high in hope are more likely to seek help if gambling-related problems were to emerge, suggesting that, as well as making for positive intervention and prevention, hope can also aid in the recovery process.

Ethics Declarations

Ethical Approval:

All procedures performed in experiments/studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent

Informed consent was obtained from all individual participants included in the experiments/studies.

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1 Chapter 1: Introduction

1.1 Problem Gambling: Setting the Scene

Problem gambling (PG) is defined as any gambling that creates a range of adverse consequences for the gambler and/or their friends and family (see Dickerson, McMillen, Hallebone, Volberg & Woolley, 1997; Ferris & Wynne, 2001; Griffiths, 1996; Langham, Thorne, Browne, Donaldson, Rose & Rockloff, 2015; McMillen & Wenzel, 2006). It is now widely accepted that PG "occurs when gambling gives rise to harm to the individual gamblers, families, other groups and the community as a whole" (McMillen & Wenzel, 2006, *pp*. 150). In this sense, an individual is classified as a problem gambler when his/her gambling behaviour causes a range of problems (i.e., adverse social and financial consequences). This definition fits well with tools commonly used to assess PG, which use cut-off points to determine whether an individual is a problem gambler or not (e.g., Ferris & Wynne, 2001; Lesieur & Blume, 1987). For example, on the Problem Gambling Severity Index (PGSI: Ferris & Wynne, 2001), a tool reported to be superior to several other well-known screens (see McMillen & Wenzel, 2006; Neal, Delfabbro & O'Neil, 2005), scores are summed up and used to categorise gamblers into (1) non-problem gamblers; (2) low risk of PG with few or no identifiable negative consequences; (3) moderate risk of PG with some negative consequences; and PG with negative consequences and a possible loss of control (scores of 8 or more).

In almost all countries where gambling is available to citizens, a small percentage of the population (typically 1-2%) report significant problems associated with their gambling (i.e., a significant range of problems which classifies them as problem gamblers) (Griffiths, 2009;

McCormick, Delfabbro & Denson, 2012). Consequently, PG has been identified as a public health concern in many countries (Brown, 2000; Brown & Raeburn, 2001; Delfabbro, King & Griffiths, 2012; Griffiths, 2001, 2004; Griffiths & Wood, 2000; Korn & Shaffer, 1999). While it is typically reported that only 1-2% of the population are recognised as problem gamblers, "when at risk gamblers are included in the equation, 15% of gamblers are vulnerable to developing a gambling problem" (Smith & Wynne, 2002, *pp*. 57), which is why many scholars have focused on the psychology of gambling and problem gambling.

Indeed, there is no widely accepted causal explanation or a single model which accounts for the aetiology of PG (see Rickwood, Blaszczynski, Delfabbro, Dowling & Heading, 2010). However, there are common elements across different frameworks, which will be discussed in more details below when reviewing the different subtypes of problem gamblers. Nonetheless, it is important to acknowledge that the aetiology of PG is both complex and multi-faceted, thus it is important to briefly review some of the major theories relating to the psychology of gambling and problem gambling. One major theory which informs the aetiology of PG is the learning theory (e.g., Anderson & Brown, 1984). The basic tenet of the learning theory is that gambling is a behaviour which is reinforced through both positive and negative reinforcement (see Rickwood et al., 2010). As an example, research findings reveal that some gamblers use gambling as a means of escaping unpleasant states (e.g., Blaszczynski & Nower, 2002); in this context, the behaviourist/learning theory perspective indicates that negative reinforcement is produced when negative emotions are temporarily allayed during gambling, in turn increasing the likelihood of continued gambling (Blaszczynski & Nower, 2002; Leary & Dickerson, 1985 ; McConaghy, 1980). On the other hand, the euphoric state triggered by gambling may be enjoyed to an extent that it also serves as a reinforcement which increases the likelihood of gambling (both recreational and PG)

(see Anderson & Brown, 1984; Dickerson, 1984). As will be discussed later in Chapter 1, the behaviourist perspective closely corresponds with the view that there are two primary subtypes of gamblers: positively reinforced gamblers who gamble for rewards (i.e., increases in arousal/excitement) and negatively reinforced gamblers who rely on gambling to escape unpleasant states (i.e., depressive mood) (see Blaszczynski et al., 2008; McGrath, Barrett, Stewart & McGrath, 2012).

While the behaviorist perspective discussed above explains one way in which individuals may fall into a cycle of continued gambling, it is not the only major perspective that provides insight on why individuals may gamble problematically. There is much literature on how cognitive distortions could also trigger the onset and maintenance of PG (Ladouceur & Walker, 1996; Petry, 2005). Cognitive behavioral models posit that erroneous beliefs and cognitive distortions can play a significant role in the onset and maintenance of PG. In support of cognitive models, empirical evidence indicates that some gamblers are under the impression that they have reliable means of manipulating outcomes in their favour, irrespective of available information on the probability of winning (see Ladouceur, Sylvain, Boutin, & Doucet, 2004). While there is growing evidence that erroneous beliefs and cognitive distortions can trigger the onset and maintenance of PG, there is some scepticism on whether cognitive theories can explain the pathway from recreational to PG. For instance, Rickwood and colleagues (2010) report that "cognitive theories have yet to explain the functional interaction between arousal, conditioning, and cognitive activity, or the transition from recreational to problem gambling" (*pp*. 17).

The personality theory is also prevalent in the gambling literature; while there is no specific personality profile found among problem gamblers, scholars have found a relationship

between some personality trait scores and PG (see Raylu & Oei, 2002). Indeed, personality traits such as impulsivity and sensation-seeking have commonly been associated with risky behaviours (Zuckerman, 2007). The definitions of these two traits shed some light on their relationship to gambling; sensation-seeking refers to a preference for stimulating experiences and the propensity to take risks to obtain such experiences (Zuckerman, 1994), and impulsivity refers to the tendency to prefer short-term rewards without much thought of the potential long-term consequences (Eysenck, Pearson, Easting & Allsopp, 1985). Both impulsivity and sensation-seeking have been associated with problem gambling (see Mishra, Lalumiere & Williams, 2010), though empirical studies examining the relationship between these personality traits and PG often produce mixed results (see Mishra et al., 2010).

In response to the several major theories and models related to the psychology of gambling and problem gambling, there has been a shift from individual theories and models to more advanced and integrated models (see Rickwood et al., 2010). Integrated models include some of the major variables discussed above, which have been empirically shown to be associated with PG. Moreover, integrated models acknowledge that there are several pathways to PG, which suggests that there are several subtypes of gamblers, whose motives for gambling differ (Rickwood et al., 2010). As an example, Blaszczynski and Nower's (2002) pathway model is a prominent integrated model which is now widely referenced in the gambling literature; it is based on the assumption that "pathological gamblers represent a heterogeneous group that could be sub-typed according to underlying motivation and benefits derived from gambling" (Rickwood et al., 2010, *pp*. 20). As will be discussed throughout this thesis, integrated models such as Blaszczynski and Nower's (2002) pathway model acknowledge that several factors such as conditioning, arousal, affective state, and cognitive distortions can all play a role in the transition from recreational to PG, with some variables

playing a greater role than others in different subtypes of gamblers. Overall, integrated models recognise that the aetiology of PG is both complex and multi-faceted, and that there is no one pathway to PG; instead, there are several subtypes of gamblers, each with unique pathways to PG. As will be discussed in this thesis, this highlights the need to develop specific targeted interventions which will be differentially effective across different subtypes of gamblers and/or PG typologies (Blaszczynski, 2000).

While the aetiology of PG remains complex and multi-faceted, its adverse consequences is well established in the literature (see Fong, 2005; Goodwin, Browne, Rockloff & Rose, 2017; Neal, Delfabbro & O'Neil, 2005). The social and financial consequences of PG are among some of the most established in the literature. Bankruptcy, engagement in criminal activities, employment and relationship issues are some of the common adverse consequences problem gamblers face (see Ferland, Fournier, Ladouceur, Brochu, Bouchard & Pâquet, 2008; Fong, 2005; Grant, Schreiber, Odlaug & Kim, 2010; Turner, Preston, Saunders, McAvoy & Jain, 2009). For instance, findings indicate that problem gamblers have higher rates of bankruptcy than the general population and are more likely to fund their excessive gambling through illegal and dangerous ways (i.e., by using loan sharks to obtain money) (Gerstein, Murphy, Toce, Hoffmann, Palmer, Johnson et al., 2008). Indeed, bankruptcy and financial hardship in general is likely to take its toll on individuals; as an example, Fong (2005) suggests that even when problem gamblers do not experience bankruptcy, their credit ratings often suffer, which can in turn limit individuals from opening new bank accounts or securing loans/mortgages. A more severe consequence of financial hardship is the inability to pay for one's accommodation; there is some evidence that PG is a contributing factor to homelessness (Holdsworth, Tiyce & Hing, 2012; National Gambling Impact, & Policy Commission (US), 1999).

Financial hardship caused by PG could also trigger involvement in criminal activities (Banks, 2016; Fong, 2005; Lind, Kääriäinen & Kuoppamäki, 2015). Although some criminals become problem gamblers, it is more common for problem gamblers to engage in criminal activities to fund their ongoing gambling problems (Turner, Preston, McAvoy, & Gillam, 2013). In support, Lind and colleagues (2015) found that the majority of problem gamblers in their study engaged in criminal activities after becoming a problem gambler. Among the most common crimes committed by problem gamblers are those which are economic in nature, such as theft, forgery and embezzlement at the workplace (Binde, 2017; Blaszczynski & McConaghy, 1994; Meyer & Stadler, 1999; Turner et al., 2009; Zurhold, Verthein & Kalke, 2014). For instance, Sakurai and Smith (2003) found that 15% of individuals sentenced for serious fraud blamed gambling for their criminal activities.

While financial hardship and engagement in criminal activities are common consequences of PG (Binde, 2017; Fong, 2005; Lind et al., 2015; Turner et al., 2009), it is also reported that excessive gambling has a dramatic impact on mental health. Although the relationship between mental health and PG is mostly correlational, there is some indication that PG can trigger or magnify symptoms of depression and anxiety (see Fong, 2005). The severe impacts of PG on mental health is highlighted by the relationship between PG and suicidal ideations. Findings indicate that between 17 to 24% of problem gamblers attempt suicide, often after incurring a large loss (Kausch, 2003; Ledgerwood & Petry, 2004). Maccallum and Blaszczynski (2003) found that approximately 80% of individuals calling a gambling helpline had suicidal ideations. Moreover, findings indicate that increased gambling severity and the resultant financial hardship (i.e., bankruptcy and debts) could lead problem gamblers to contemplate and attempt suicide (Ledgerwood & Petry, 2004; Petry & Kiluk, 2002).

As discussed above, many research papers have showcased the adverse effects of PG on the problem gambler. However, there is also evidence that family, friends and the wider community can be impacted by others' gambling (Clarke, Abbott, DeSouza & Bellringer, 2007; Dowling, Rodda, Lubman & Jackson, 2014; Ferland et al., 2008; Fong, 2005; Goodwin et al., 2017; Hing, Tiyce, Holdsworth & Nuske, 2013; Holdsworth, Nuske, Tiyce & Hing, 2013; Kalischuk, Nowatzki, Cardwell, Klein & Solowoniuk, 2006; McComb, Lee & Sprenkle, 2009; Orford, Templeton, Velleman & Copello, 2005; Salonen, Castrén, Alho & Lahti, 2014; Wenzel, Øren & Bakken, 2008). For instance, Wenzel and colleagues (2008) found that partners of problem gamblers experienced increased conflicts, financial hardship and physical and mental health problems. Moreover, studies have found that problem gamblers' spouses face increased problems at work, have more marital problems and are more likely to depend on alcohol and drugs (Ferland et al., 2008; Hing et al., 2013; Holdsworth et al., 2013). Children of problem gamblers also face adverse mental and physical health problems, which research suggests is due to neglect and/or exhausted resources (Darbyshire, Oster & Carrig, 2001; Shaw, Forbush, Schlinder, Rosenman & Black, 2007).

Generally, research in various international settings have revealed that each problem gambler impacts the lives of 5 to 17 people (Goodwin et al., 2017; Politzer, Yesalis & Hudak, 1992; Productivity Commission, 2010). Generally, each adult problem gambler impacts the lives of more people than adolescent gamblers, though this may be due to adult gamblers having a greater number of people in their lives that are aware of their gambling problems (see Velleman, Cousins & Orford, 2015). While problem gamblers and their close family members are likely to experience greater consequences, the wider community are also likely to experience adverse consequences (Clarke et al., 2007; Gerstein, Volberg, Toce, Harwood,

Johnson, Buie et al., 1999). For example, employers of problem gamblers are also impacted by their employee's excessive gambling (Fong, 2005; Gerstein et al., 1999). To elaborate, lateness, absenteeism, embezzlement and reduced productivity during working hours are some of the negative consequences reported by employers of problem gamblers (see Fong, 2005). Findings indicate that reduced productivity and legal expenses related to PG can cost governments and the public approximately $5 billion annually (Gerstein et al., 1999; National Research Council, 1999), though other economists believe that PG can cost USA as much as $54 billion annually (Grinols, 2004). This figure is lower in Great Britain, with illustrative estimates suggesting that PG will cost Great Britain's public finances anything between £260 million to £1.16 billion annually (Thorley, Stirling & Huynh, 2016).

It is well-evidenced that PG has adverse consequences for problem gamblers, their family, friends and the wider community (Goodwin et al., 2017). However, it is suggested that early detection, intervention and treatment can prevent/reduce the negative consequences of PG (Fong, 2005). For this reason, psychologists continue to examine factors that play a role in the transition from recreational to PG (McCormick, Delfabbro & Denson, 2012). Indeed, scholars have found many risk factors that might lead to the development and maintenance of PG, including male gender, socio-economic status, impulsivity, excitement-seeking, maladaptive coping strategies, life stress, substance use, mental health (anxiety and depression), family problems, school difficulties and so on (see Ariyabuddhiphongs, 2013; Blinn-Pike, Worthy & Jonkman, 2010; Dickson, Derevensky & Gupta, 2002, 2008; Dowling, Merkouris, Greenwood, Oldenhof, Toumbourou & Youssef, 2017; Griffiths, Parke & Wood, 2002; Griffiths, Wardle, Orford, Sproston & Erens, 2009; Hardoon & Derevensky, 2002; Lussier, Derevensky, Gupta & Vitaro, 2014; Messerlian, Gillespie, & Derevensky, 2007; Shead, Derevensky, & Gupta, 2010).

Among some of the variables stated above as leading to the development and maintenance of PG (e.g., family problems, life stress and mental health), one common theme is that these factors generate painful realities, which individuals seek to escape from. This line of research indicates that gambling is used as a tool to escape painful events and emotions, consistent with the affective theory which indicates that "pathological gamblers gamble more frequently when reality is more painful" (Lamberton & Oei, 1997, *pp*. 88). Similar findings are reported in research exploring factors predictive of gambling problems among adolescents. That is, negative life events and painful experiences in general are associated with PG severity among adolescents (e.g., Bergevin, Gupta, Derevensky & Kaufman, 2006). For instance, high rates of self-reported physical and sexual abuse as a child have been found amongst problem gamblers seeking treatment (see Ciarrocchi & Richardson, 1989). In a more recent review, Lane, Sacco, Downton, Ludeman, Levy and Tracy (2016) found that child abuse and neglect are positively correlated with gambling problems in adulthood. These findings are consistent with Jacobs' (1988) claims that feelings of inadequacy, inferiority and a pervasive sense of rejection by parents and significant others during childhood/adolescence could trigger the development and maintenance of PG.

Many empirical studies have found a relationship between psychological vulnerabilities (i.e., anxiety and depression) and PG among both adults and adolescents. For instance, several studies have revealed that problem gamblers score higher on depression and anxiety scales (see McCormick, Delfabbro & Denson, 2012 for a review), on avoidant and emotion-based coping scales (Rodda, Brown & Phillips, 2004; Scannell, Quirk, Smith, Maddern, & Dickerson, 2000; Scherrer, Xian, Kapp, Waterman, Shah, Volberg & Eisen, 2007), and are more likely to have experienced trauma, abuse or stressful life events than non-problem

gamblers (see Delfabbro, 2013). Indeed, much of the evidence in the gambling literature indicates that variables which engender painful realities lead to the onset of PG, which is consonant with claims that gambling is used as a tool to escape painful realities (see Jacobs, 1986). It is widely acknowledged that gambling can lead to dissociative-like states by allowing individuals to immerse completely in the activity; that is, by gambling, individuals are able to disengage from other problems in life, which can in turn encourage individuals to use excessive gambling when attempting to escape from difficulties.

In addition to gambling to escape difficulties, research also indicates that some individuals gamble to have fun and relieve boredom or feelings of boredom (see McNeilly and Burke, 2000). This line of research indicates that PG develops when gamblers attempt to "reach and maintain a subjective phenomenological state of excitement" (Lamberton & Oei, 1997, *pp*. 89). Indeed, variables which engender difficulties are not the only route to PG, there is some evidence that gambling to win money, to seek excitement or challenge, and to socialise could encourage individuals to gamble more regularly, leading to potential problems (Hong, Sacco & Cunningham-Williams, 2009; Moore, 2001; Southwell, Boreham & Laffan, 2008). However, there is evidence that variables which lead to difficulties are more likely to cause PG than variables that are associated with fun, excitement and socialising. For instance, Hing, Breen, Gordon and Russell (2014) found that individuals who "gamble to socialise with family and friends are significantly less likely to be problem gamblers" (*pp*. 503); in the same study, Hing and colleagues found that suffering recent difficulties in life (i.e., being separated, divorced or widowed) is significantly associated with PG.

While the variables discussed above could trigger the onset of PG, there are also cognitive biases that contribute to the development and maintenance of PG. For example, empirical

studies have found that some problem gamblers believe that they have reliable means of manipulating outcomes in their favour (see Johansson, Grant, Kim, Odlaug & Götestam, 2009 for a review). Another form of cognitive bias that has been found to contribute to PG is 'gambler's fallacy' (see Clotfelter & Cook, 1993). The gambler's fallacy is the belief that the probability of an event is lowered when that event has recently occurred; for example, individuals may believe that a series of losses will reduce the likelihood of future losses, thus continuing to gamble as they believe a win is near. Another cognitive bias that has been found to interact with the development of PG is the 'illusion of control' (see Johansson et al., 2009; Moore & Ohtsuka, 1999), which is described as "an expectancy of personal success inappropriately higher than the objective probability would warrant" (Langer, 1975, *pp.* 316).

As discussed above, decades of research indicate that the aetiology of PG is complex and multi-faceted (Blaszczynski & Nower 2002; Brown 1986; Griffiths & Delfabbro 2001; Moran 1970), nonetheless, two factors (arousal and mood) consistently emerge in the literature (Goldstein, Stewart, Hoaken & Flett, 2014; McCormick et al., 2012). Many of the variables discussed above indicate that the need to (1) seek arousal (i.e., seek excitement and fun), or (2) escape difficulties (i.e., disengage from life problems and negative feelings) trigger the onset of PG. Indeed, models and theories of PG indicate that gambling to increase arousal (i.e., excitement induction) and to escape negative affect (or mitigate negative affect) are two prevalent reasons for excessive gambling (Blaszczynski & Nower, 2002; Jacobs, 1986; McCormick, 1988; Sharpe, 2004; Stewart, Zack, Collins, Klein & Fragopoulos, 2008; Wulfert, Roland, Hartley, Wang & Franco, 2005). As well as arousal and mood being regarded as important drivers of gambling behaviour (Beaudoin & Cox, 1999; Blaszczynski & Nower, 2002; Moodie & Finnigan, 2004; Sharpe, 2004; Wulfert et al., 2005), many motivational models argue that the two also influence a range of other addictive behaviours

(Cooper, Frone, Russell & Mudar, 1995; Cox & Klinger, 1990; Simons, Gaher, Correia, Hansen & Christopher, 2005). Therefore, the evidence for the role of arousal and mood on gambling behaviour is reviewed below.

1.1.1 Arousal and Gambling

In many contexts, including gambling, arousal is often defined as excitement; consonant with this definition, many empirical studies across various disciplines have used physiological arousal as an assessment of excitement (see Adam, Kräner & Weinhardt, 2012; Baudinet & Blaszczynski, 2013; Zillmann, 1991), which is supported by findings that physiological arousal is positively correlated with subjective excitement (e.g., Wulfert et al., 2005). For this reason, many scholars claim that gambling is about "action, an aroused euphoric state" (Wulfert et al., 2005, *pp*. 311). Put differently, the euphoric state triggered by gambling is enjoyed to an extent that it serves as a reinforcement that promotes gambling (both recreational and PG) (see Anderson & Brown, 1984; Dickerson, 1984). In particular, under-aroused individuals are likely to seek increases in arousal level (e.g., Schmidt, Mussel & Hewig, 2013). In an attempt to explain this relationship, studies have revealed that low arousal is often interpreted as calming/relaxing (see Bradley & Lang, 1999; Mehrabian & Russell, 1974), a state that motivates individuals to seek some excitement/stimulation (see Berlyne, 1960).

Empirical findings indicate that individuals experiencing low arousal prefer greater leisure activity and action; conversely, individuals experiencing heightened arousal levels have a preference for more tranquil activities (Wahlers & Etzel, 1985). For example, an individual living a peaceful suburban lifestyle may prefer a city break for vacation, where they are able to experience more stimulation, whereas, an individual living and working in the city may

prefer a more calming/relaxing vacation (see Iso-Ahola, 1980, 1983, 2006). However, low arousal is not always defined as calming/relaxing, just as high arousal is not always defined positively as excitement; empirical findings reveal that low arousal could also be negatively valenced and thus be interpreted as sadness, while high arousal could be interpreted negatively as anger/anxiety (see Bradley & Lang, 1999). Thus, only individuals experiencing positively valenced low arousal may be motivated to use gambling as a means of increasing arousal levels; as will be discussed in Chapter 2, positively valenced high arousal is interpreted as excitement/euphoric (which individuals in positive mood may desire to achieve), whereas negatively valenced high arousal is an agitating/stressful experience (i.e., anger/anxiety: see Bradley & Lang, 1999; Mehrabian & Russell, 1974).

Despite some of the inconsistencies, the argument that increases in arousal reinforces addictive behaviours (see Jacobs, 1986) has inspired many psychologists to explore the relationship between arousal and gambling behaviour in more depth (Brown, 1986; Griffiths, 1988, 1990, 1993; Rockloff & Dyer, 2006; Rockloff, Signal & Dyer, 2007). Hebb's (1955) optimal arousal theory posits that when arousal levels are low, individuals seek increases in arousal level and are likely to repeat behaviours that drive them towards their optimal arousal level. For this reason, Hebb argues that seeking an optimal arousal level explains the "positive attraction of risk taking" (Hebb, 1955, *pp*. 250). Indeed, gambling is one way in which individuals can increase their arousal levels as evidenced by increases in heart rate, galvanic skin response and cortisol levels during gambling sessions (Coventry & Hudson, 2001; Coventry & Norman, 1997; Krueger, Schedlowski & Meyer, 2005; Ladouceur, Sévigny, Blaszczynski, O'Connor & Lavoie, 2003; Meyer, Hauffa, Schedlowski, Pawlak, Stadler & Exton, 2000; Sharpe, 2004; Wulfert et al., 2005). This suggests that under-aroused

individuals may use gambling as a means of increasing their arousal to an optimal level (Schmidt et al., 2013).

In fact, a common view among scholars is that risk takers experience chronically low arousal levels (see Fowles, 1980; Zuckerman, 1983). Brown (1986) posited that problem gamblers are chronically under-aroused and use gambling to reach optimal levels of arousal. In support, Schmidt and colleagues (2013) found that individuals with low resting heart rate opted for riskier gambles than individuals with higher resting heart rate. In an attempt to discover the relationship between under-arousal and gambling behaviour, scholars have suggested that states of under-arousal are a form of boredom that individuals seek to overcome by engaging in exciting (i.e., arousal-inducing) activities such as gambling (e.g., Brown, 1987; Mercer-Lynn, Flora, Fahlman & Eastwood, 2013). While the relationship between boredom and the tendency to seek excitement have long been speculated in the literature (Berlyne, 1960; Csikszentmihalyi, 2000; De Chenne, 1988; Hebb, 1966), findings in the last couple of decades indicate that increases in physiological arousal are correlated with subjective excitement (see Wulfert et al., 2005). In short, some individuals view gambling as an exciting (arousal-inducing) activity that can relieve boredom (e.g., Anderson & Brown, 1984), consistent with Mercer-Lynn and colleagues' (2013) findings that boredom susceptibility (i.e., boredom related to a desire for arousal) is a unique predictor of gambling behaviour.

While there is some evidence that boredom resembles a state of under-arousal and positive valence, it is suggested that states of under-arousal and negative valence also correspond with boredom (see Goetz & Frenzel, 2006; Goetz, Frenzel, Hall, Nett, Pekrun & Lipnevich, 2014). For this reason, there is some suggestion that under-aroused individuals gamble to escape

their aversive state (e.g., Blaszczynski, McConaghy & Frankova, 1990), a different view to that discussed above (i.e., individuals use gambling to increase excitement and enhance their mood) (e.g., Mercer & Eastwood, 2010; Mercer-Lynn et al., 2013). Consistent with the notion that boredom can be either negatively or positively valenced, two well-known scales have been devised in the literature: The Boredom Proneness Scale (BPS: Farmer & Sundberg, 1986) and the Boredom Susceptibility Scale (ZBS: Zuckerman, 1979). The ZBS classifies boredom as "related to high levels of positive affect" with desires for arousal (Mercer-Lynn et al., 2013, *pp*. 592), whereas the BPS classifies boredom as an aversive state which individuals desire to escape from (see Mercer, Flora, Fahlman & Eastwood, 2009 for a review). Studies administering both scales have found that boredom susceptibility scores, but not boredom proneness scores predict gambling behaviour (Mercer & Eastwood, 2010; Mercer-Lynn et al., 2013). More specifically, these empirical studies reveal that greater levels of boredom susceptibility (i.e., boredom related to desires for increased arousal/excitement) predicted gambling behaviour (see Mercer & Eastwood, 2010; Mercer-Lynn et al., 2013).

As discussed, there is much evidence that boredom (i.e., states of under-arousal) encourages gambling behaviours (Blaszczynski et al., 1990; Mercer & Eastwood, 2010; Neighbors, Lostutter, Cronce & Larimer, 2002). However, explanations for this relationship depend on whether boredom is characterised as an aversive state or not (Goetz et al., 2014; Mercer et al., 2009; Mercer-Lynn et al., 2013). One explanation is that states of under-arousal are aversive (negatively valenced), and therefore individuals use gambling as a means of escaping their aversive under-aroused state (e.g., Blaszczynski et al., 1990). An alternative and better-evidenced explanation implies that boredom is related to positive affect and that bored individuals use gambling to increase their arousal level and in turn enhance their positive mood states (Mercer & Eastwood, 2010). Indeed, the latter view is consistent with Stewart

and colleagues' (2008) suggestion that individuals who gamble to overcome boredom are similar to *enhancement gamblers* (i.e., individuals who gamble to enhance their mood). In further support, findings reveal that individuals with high boredom susceptibility scores (i.e., under-arousal related to positive affect) are more likely to "engage in risky or excitement-seeking behaviours (e.g., alcohol abuse or problem gambling behaviours) in order to obtain reward, experience positive affect, and elevate their level of arousal" (Mercer-Lynn et al., 2013, *pp*. 591).

While an extensive amount of research reveals that states of under-arousal encourage gambling (e.g., Anderson & Brown, 1984; Brown, 1987; Mercer-Lynn et al., 2013; Schmidt et al., 2013), there remains some doubt (e.g., Breen & Zuckerman, 1999). Indeed, other scholars have questioned the relationship between under-arousal and gambling (e.g., Dickerson, Hinchy, England, Fabre & Cunningham, 1992); more specifically, Dickerson and colleagues' (1992) reported that arousal was not predictive of either play rates or gambling persistence. Moreover, Blaszczynski, Wilson and McConaghy (1986) argued that the relationship between arousal and PG is scant, instead positing that desires to avoid dysphoric mood is a key contributor to persistence gambling and PG. Shedding further doubt on the relationship between arousal and PG, empirical research either found a weak correlation between arousal and gambling persistence (Dickerson, Hinchy & Fabre, 1987) or failed to find a relationship altogether (Allcock & Grace, 1988), though both studies used the Sensation Seeking Scale (Zuckerman, 1979) to assess arousal-seeking tendency (a scale based on the optimal arousal theory: see Zuckerman, 1991) as opposed to objective assessments (i.e., physiological arousal) commonly used in more recent studies.

As discussed, some studies that have failed to find a relationship between arousal and gambling behaviour have used the Sensation Seeking Scale (e.g., Allcock & Grace, 1988), which can raise questions on whether arousal was actually assessed or not. Nonetheless, studies that have used physiological arousal (heart rate) and subjective excitement found that "neither measure of arousal was consistently predictive of play rates nor of persistence" (Dickerson et al., 1992, *pp*. 246), which further highlights the inconsistencies reported in the gambling literature. While some empirical studies have failed to replicate findings that showcase under-arousal is related to increased gambling rates and persistence (e.g., Blaszczynski et al., 1986; Dickerson et al., 1992), others have found the opposite effect; that is, heightened arousal levels, instead of states of under-arousal, increased gambling (e.g., FeldmanHall, Glimcher, Baker & Phelps, 2016; Phelps, Lempert & Sokol-Hessner, 2014).

Rockloff, Signal and Dyer (2007) provided an explanation for the inconsistent results by indicating that the role of arousal on gambling behaviour differs for different subgroups of gamblers. Rockloff and colleagues (2007) found that increased arousal levels increased gambling intensity for some gamblers and reduced it for others; more specifically, it was found that increased physiological arousal increased gambling intensity among individuals with few gambling problems, but reduced gambling intensity among at-risk and problem gamblers. The authors went on to explain that physiological arousal may be interpreted differently by subgroups of gamblers; that is, individuals with few gambling problems may interpret increased physiological arousal as an upcoming win, while at-risk and problem gamblers may interpret increased arousal levels as a warning for an imminent loss. This explanation suggests that the interpretation of states of under-arousal and hyper-arousal are more likely to indicate how arousal levels affect gambling behaviour than which subgroup of gamblers individuals fall into. Indeed, Rockloff and Greer (2010) later found that "the

influence of arousal on gambling behaviour is dependent on the cognitive interpretation of that feeling-state" (*pp*. 580). Put differently, the mixed results may be due to empirical studies examining the role of arousal on gambling behaviour in isolation, as opposed to in interaction with valence (negative vs positive states); as will be explored in Chapter 2, valence impacts interpretation of arousal.

In sum, there is a substantial amount of research that indicates states of under-arousal encourage gambling behaviours (Brown, 1987; Mercer-Lynn et al., 2013; Schmidt et al., 2013). However, other research findings reveal that the role of arousal on gambling behaviour is more complex than initially posited (e.g., Rockloff et al., 2007; Rockloff & Greer, 2010). Moreover, some scholars have failed to find a significant relationship between arousal and gambling behaviour altogether (Allcock & Grace, 1988; Dickerson et al., 1992). Therefore, the inconsistent findings in the literature and the lack of explanation for the inconsistencies insinuates that the role of arousal on PG should be reconsidered.

1.1.2 Mood and Gambling

Like arousal, mood is also a factor commonly associated with gambling behaviour. While the definition of mood is varied in the literature (see Batson, Shaw & Oleson, 1992; Ekkekakis, 2012), feelings of either pleasure or displeasure often indicate whether an individual is in a negative mood state or a positive one (see Watson, 2002). For example, anger, anxiety, depression, fear, resentment and sadness are all considered as negative mood due to the displeasure individuals feel under such states, whereas pleasurable states such as excitement, happiness, joy and relaxation reflect positive mood (Watson, 2002). These two broad dimensions "emerge consistently across diverse descriptor sets, time frames, response formats, languages and cultures" (Watson, 2002, *pp*. 107). While the terms affect, emotion

and mood may be used interchangeably in the remainder of this thesis, emphasis will be put on whether the affective state referred to is pleasant (positive) or unpleasant (negative).

Empirical studies examining the role of mood on gambling often indicate that a range of negative mood states (i.e., depressive mood) encourage gambling behaviour (Griffiths, 1995). Similarly, studies have found a relationship between depression and PG (Kim, Grant, Eckert, Faris & Hartman, 2006; McCormick, Russo, Ramirez & Taber, 1984; Petry, Stinson & Grant, 2005). There is much evidence that individuals use gambling to escape from a range of negative mood states (e.g., Wood & Griffiths, 2007); accordingly, there is much suggestion that gambling to allay negative emotions can lead to PG (Blaszczynski, 2000). In fact, in the gambling literature, gambling to cope with and/or escape negative emotions and psychological states is among the most common reasons provided for PG (Blaszczynski & McConaghy, 1989; Blaszczynski & Nower, 2002; Dickerson, Baron, Hong & Cottrell, 1996; Wood & Griffiths, 2007). Griffiths (1995) found that regular and problem gamblers experienced more depressive moods prior to gambling, which is consistent with pathway models of PG that indicate the emotionally vulnerable use gambling to disengage/escape from negative emotions (e.g., Blaszczynski & Nower, 2002; McCormick, 1988).

In support of the notion that some individuals gamble problematically to temporarily allay or escape negative emotions (Wood & Griffiths, 2007), Matthews, Farnsworth and Griffiths (2009) found that problem gamblers are "people who generally feel a broad range of negative mood states" such as "anger, disgust, scorn, guilt, fearfulness, depression and so on" (*pp*. 744). Negative emotions not only contribute to the development of PG (Blaszczynski, 2000; Blaszczynski & Nower, 2002; Wood & Griffiths, 2007), but could also be a causal factor for the maintenance of PG (Rodda, Brown & Phillips, 2004). For instance, Baumeister and Scher

(1988) posit that the immediate relief from negative emotions is likely to make risky behaviours attractive. Similarly, consistent with reinforcement models of addiction (e.g., Cappell & LeBlanc, 1981; Hershon, 1977; Robinson & Berridge, 1993), the gambling literature often posits that the temporary disengagement from negative affective states (i.e., anxiety and depressive mood) during gambling produces negative reinforcement which encourages the development and maintenance of PG (see Blaszczynski & Nower, 2002; Blaszczynski, Walker, Sharpe & Nower, 2008; Tavares, Zilberman, Hodgins & El-Guebaly, 2005).

Consistent with models of gambling that posit negative reinforcement leads to the development and maintenance of PG (e.g., Blaszczynski & Nower, 2002), McCormick's (1988) prominent need state model of gambling posits that individuals who gamble to allay unpleasant states will notice a pleasant change in their need state during gambling (i.e., a temporary mitigation of negative mood or even euphoria). This temporary relief from unpleasant states motivates individuals to consider gambling when struggling with unpleasant states again, which can lead to ongoing gambling and eventually PG. However, the relief from unpleasant states is often temporary, in fact, by gambling, individuals neglect their problems and incur more losses, both of which intensify the need state (i.e., magnify negative emotions) once the gambling session is over; the increased intensity in need state is then likely to encourage individuals to gamble again to escape their amplified unpleasant state, triggering a vicious cycle of PG (McCormick, 1988).

As discussed, there is a substantial amount of evidence that negative emotions can lead to the development and maintenance of PG, with the common explanation that individuals under negative mood states use gambling to cope with and/or escape their unpleasant states (see

Compas, Connor-Smith, Saltzman, Thomsen & Wadsworth, 2001; Gupta & Derevensky, 2001; Marget, 2002; Nower, Derevensky & Gupta, 2004; Scannell et al., 2000; Thomas, Sullivan & Allen, 2009; Wood, Gupta, Derevensky & Griffiths, 2004). In support, a qualitative study by Wood and Griffiths (2007) found that "escape was the prime characteristic of the gambling experience that facilitated the continuation of problem gambling" (*pp*. 119). Findings from quantitative research also support the notion that unpleasant states lead to greater gambling intensity and persistence; for instance, Rockloff, Greer, Fay and Evans (2011) found that gambling is used as a distractor from unpleasant states.

Although there is much evidence that negative emotions lead to the development and maintenance of PG (e.g. Blaszczynski, 2000; Rodda et al., 2004; Wood & Griffiths, 2007), consonant with prominent models of PG (e.g., Blaszczynski & Nower, 2002; McCormick, 1988), there remains some scepticism in the literature. For example, Mishra, Morgan, Lalumière and Williams (2010) did not find a relationship between pre-gambling mood induction and gambling. Mishra and colleagues' (2010) concluded that neither happy nor sad mood prior to gambling impacted gambling behaviour, which is inconsistent with findings that negative mood states incite individuals to gamble with greater intensity and persistence (e.g., Gupta & Derevensky, 2001; Marget, 2002; Rockloff et al., 2011). Similarly, Hills, Hill, Mamone and Dickerson (2001) found that negative emotions prior to gambling did not influence gambling persistence as previously reported (Dickerson, 1993; Dickerson & Adcock, 1987). Adding to the inconsistency, De Vries, Holland and Witteman (2008) found that both naturally occurring and experimentally induced negative mood states made individuals more risk-averse in the IOWA Gambling Task.

Other scholars have found completely contradictory results to those commonly reported in the literature; for instance, Cyders and Smith (2008) not only failed to find that negative emotional states increase gambling as commonly suggested but instead found the opposite, that is "increases in gambling are tied to positive affect" (*pp*. 6). This is consistent with Isen and Patrick's (1983) empirical study which found individuals under positive mood states placed larger bets on a game of roulette than individuals under neutral mood states, though positive affect can also lead to risk aversion under certain circumstances (see Isen & Geva, 1987). Moreover, results have also found that negative affect (i.e., feelings of guilt) encouraged episodic cessation of gambling among some individuals (Wohl, Lyon, Donnelly, Young, Matheson & Anisman, 2008), thus contradicting research findings that negative emotions encourage gambling behaviours. Wohl and colleagues' (2008) findings is in line with Hodgins, Wynne and Makarchuk's (1999) results that negative emotional states, particularly stress and depression, encouraged some problem gamblers to quit gambling.

This inconsistency on the effects of mood on gambling behaviour is also prevalent in other risk-taking literature. For example, Yuen and Lee (2003) found that individuals under positive mood states show greater willingness to take risks than those in negative mood states, whereas, Leith and Baumeister (1996) found the opposite, that is, negative mood states foster risk-taking in decision-making tasks. Likewise, some studies have found that negative mood states (i.e., depressive mood and fatigue) increased riskiness in everyday decision-making (Hockey, Maule, Clough & Bdzola, 2000), consistent with findings that negative mood states trigger risky driving (Hu, Xie & Li, 2013). On the other hand, studies have shown that positive affect elicited by priming procedures "resulted in a greater willingness to drive recklessly than neutral or anger-evoking priming" (Taubman-Ben-Ari, 2012, *pp*. 724). Similar inconsistencies have been found in research examining the role of mood states on

risky sexual behaviour. That is, some studies indicate that negative mood increases sexual risk-taking (Deckman & DeWall, 2011), consistent with the notion that individuals engage in a range of risky addictive behaviours to escape unpleasant states (see Kassel, Greenstein, Evatt, Roesch, Veilleux, Wardle & Yates, 2007), while others claim that negative affect reduce sexual risk-taking (Grov, Golub, Mustanski & Parsons, 2010).

In sum, there is a large body of research that indicates negative emotions encourage gambling (Blaszczynski, 2000; Rodda et al., 2004) and other risky behaviours (Deckman & DeWall, 2011; Hu, Xie & Li, 2013), with majority of scholars claiming that risky behaviours allow individuals under negative mood states to cope with and/or escape their unpleasant states (Blaszczynski & Nower, 2002; Kassel et al., 2007; Wood & Griffiths, 2007). Yet, there are inconsistencies in the literature, with some studies indicating that negative mood has no impact on gambling (e.g., Mishra et al., 2010) and others discovering that negative mood states reduce gambling persistence (e.g., Wohl et al., 2008). Adding to the inconsistencies, some empirical studies indicate that positive mood, not negative, encourage gambling behaviours (Cyders & Smith, 2008). Consequently, there is a need to revisit the role of mood on gambling behaviour to provide an explanation for the inconsistencies reported in the literature.

1.1.3 The Importance of Reconsidering the Role of Arousal and Mood

As discussed throughout this Chapter, findings on the effects of arousal and mood on gambling behaviour is mixed. Despite the inconsistencies reported in the gambling literature, models and theories of PG consistently argue that problem gamblers can be categorised into two subtypes: those who use gambling to (1) increase arousal levels (i.e., under-aroused individuals), and (2) escape negative emotions (i.e., individuals under depressive mood

states) (Blaszczynski & Nower, 2002; McCormick, 1988; Sharpe, 2004; Stewart et al., 2008; Wulfert et al., 2005). Indeed, this is in line with empirical studies that indicate states of under-arousal (e.g., Mercer & Eastwood, 2010; Schmidt et al., 2013) and negative emotions (e.g., Blaszczynski, 2000; Rodda et al., 2004) increase gambling intensity and persistence. The notion that increases in arousal level and negative emotions lead to the development and maintenance of PG is also supported from a behavioural perspective (i.e., operant conditioning: see Blaszczynski & Nower, 2002; Stewart & Zack, 2008).

Operant conditioning is when a behaviour is repeated/strengthened because individuals acknowledge that the behaviour (a) is rewarding (positive reinforcement), or (b) removes a negative reinforcer (negative reinforcement) (see Skinner, 1948). Applied to gambling behaviour, positive reinforcement is produced when individuals find increases in arousal level rewarding (i.e., exciting), which can lead to habitual patterns of gambling through repetition of the rewarding behaviour (Blaszczynski & Nower, 2002). Whereas, negative reinforcement is produced when negative emotions are temporarily allayed during gambling, also increasing the likelihood of continued gambling (Blaszczynski & Nower, 2002; Leary & Dickerson, 1985 ; McConaghy, 1980). The behaviourist perspective closely corresponds with the view that there are two subtypes of gamblers: positively reinforced gamblers who gamble for rewards (i.e., increases in arousal/excitement) and negatively reinforced gamblers who rely on gambling to escape unpleasant states (i.e., depressive mood) (see Blaszczynski et al., 2008; McGrath, Barrett, Stewart & McGrath, 2012).

Many models and theories of gambling motives continue to suggest that gambling to increase arousal levels or avoid/escape negative emotions could lead to the development and maintenance of PG (Blaszczynski et al., 1990; Blaszczynski & Nower, 2002; McCormick,

1988; Stewart et al., 2008). While an extensive amount of empirical research also indicates that motives to increase arousal and escape negative emotions encourage gambling (e.g., Anderson & Brown, 1984; Griffiths, 1995; Mercer & Eastwood, 2010; Schmidt et al., 2013; Wood & Griffiths, 2007), there are some inconsistencies in the literature (e.g., Allcock & Grace, 1988; Mishra et al., 2010; Rockloff & Greer, 2010; Wohl et al., 2008). Therefore, it is vital to either (1) reconsider the role of arousal and mood on gambling behaviour, or (2) provide a testable explanation for the inconsistencies reported in the literature; this is particularly important as current models and theories of PG may be used to develop intervention and treatment programs. To elaborate, eliminating doubt that some gamblers use gambling to cope with/escape negative events and emotions (i.e., *escape-seekers*: see Lesieur, 2001) while others use gambling to experience excitement (i.e., increased arousal levels) would encourage more scholars to focus on proposing and testing factors that could prevent the onset of PG for each distinct subtype of gambler. For example, as briefly discussed below and explored in more details in later Chapters, findings of a positive correlation between risk-taking and severity of negative mood inspired us to propose that hope – a psychological construct rooted in Positive Psychology – and predictors of hope can protect escape-seekers from excessive and potentially problematic gambling.

1.1.4 Hope and Predictors of Hope as Protective Factors

As will be discussed in Chapter 2, findings support the notion that some gamblers (i.e., escape-seekers) use gambling as a means of coping with/escaping negative events and emotions (Lesieur, 2001). Evidence from the gambling literature indicates that escape-seekers are more vulnerable to developing PG than other subtypes of gamblers (see Milosevic & Ledgerwood, 2010 for a review). For instance, populations who resemble escape-seekers

(i.e., those who use gambling to cope with/escape negative events and emotions), such as the relatively deprived and residents of deprived neighbourhoods, are at heightened risk of developing gambling problems. Empirical findings indicate that, for the relatively deprived and residents of deprived neighbourhoods, motives for gambling derives from the need to cope with/escape negative emotions stemming from relative deprivation (see Callan, Ellard, Shead & Hodgins, 2008) and adverse deprived neighbourhood characteristics such as poor housing, overcrowding and perceived danger (see Hastings, 2009). Indeed, as will be discussed in Chapters 4 and 5, studies show that the relatively deprived and residents of deprived neighbourhoods are at heightened risk of developing gambling problems (e.g., Callan et al., 2008; Carrà, Crocamo & Bebbington, 2017).

Therefore, it is vital to develop intervention and treatment programs for populations who resemble escape-seekers (i.e., individuals who gamble to cope with/escape aversive states), who are otherwise at heightened risk of developing PG. This is why later Chapters of the current thesis examines factors that could potentially protect the emotionally vulnerable from excessive and problematic gambling. More specifically, it is proposed that hope and predictors of hope can protect populations resembling escape-seekers from excessive and problematic gambling. As will be discussed in greater details in Chapter 3, it will be examined whether hope can protect at-risk individuals from excessive and problematic gambling because higher levels in hope is indicative of the ability and motivation to find solutions to alleviate stressors and the accompanying aversive emotions, which would in turn reduce the need to engage in maladaptive behaviours (i.e., PG) as a means of disengaging from negative events and emotions (see Roesch, Duangado, Vaughn, Aldridge & Villodas, 2010). Moreover, this this thesis aims to examine whether hope can serve as a protective factor against PG because, while no studies to date have examined whether hope can protect

at-risk individuals from PG, there is some evidence from the addiction literature that hope can protect the emotionally vulnerable from a range of other addictions (e.g., Koehn, O'Neill & Sherry, 2012; Mahmoudpour, Shafiabadi & Farahbakhsh, 2015).

An overwhelming amount of empirical evidence from Positive Psychology indicates that hope can serve as a psychological strength in a variety of populations (e.g., Abdel-Khalek & Snyder, 2007; Kato & Snyder, 2005; Magaletta & Oliver, 1999; Valle, Huebner & Suldo, 2006). In addiction research, the importance of hope in intervention and recovery has long been recognised by practitioners. For example, Metzger (1988) wrote:

> *"The secret ingredient in successful therapy and major life transition is hope. The typical alcoholic client entering treatment is depleted and dispirited—in a word, hope-less. The caregiver must have a reservoir of hope to assure the client that change is possible, even when the present appears most bleak." (pp. 87–88).*

Indeed, it is posited that "positive emotions such as hope serve us best not when life is easy, but when life is difficult" (Koehn et al., 2012, *pp.* 442). In support, empirical evidence reveals that higher levels of hope can improve life satisfaction and prompt well-being by serving as a buffer against a range of maladaptive behaviours (e.g., Cedeno, Elias, Kelly & Chu, 2010; Ciarrochi, Heaven & Davies, 2007; Huen, Ip, Ho & Yip, 2015; Shorey, Little, Snyder, Kluck & Robitschek, 2007). For example, findings indicate that higher levels of hope can reduce externalising behavioural problems among individuals facing stressful life events (e.g., Horton & Wallander, 2001; Valle et al., 2006). In short, there is much evidence that hope can serve as a psychological strength during moments of difficulty (see Fredrickson,

2009; Snyder, 2002), which is especially valuable as "inheritability is not a contributing factor in hope but rather hope is learned" (Koehn et al., 2012, *pp.* 442), which is why many scholars examine methods of nurturing/teaching hope (Snyder, 1995).

While hope can be fostered in a number of ways, it is most typical to nurture hope via structured counselling and therapy sessions (e.g., Larsen, Edey & Lemay, 2007; Larsen & Stege, 2012; Lopez, Floyd, Ulven & Snyder, 2000; Rahimipour, Shahgholian & Yazdani, 2015). Nonetheless, due to the positive impacts of enhanced hope levels on health and well-being, scholars are continuously exploring new methods of nurturing hope. For example, a recent study examined whether smartphone apps can be used to deliver hope intervention (see Daugherty, Runyan, Steenbergh, Fratzke, Fry & Westra, 2018). Indeed, relative to the control group, participants who received the hope intervention via a mobile app demonstrated significantly greater increases in hope levels; moreover, users of the app found the experience to be user-friendly, helpful and enjoyable (see Daugherty et al., 2018). Methods of enhancing hope without attending counselling/therapy sessions can be particularly valuable because individuals facing problems or at heightened risk of facing problems (i.e., addictions) are often reluctant to seek formal help (i.e., attend counselling/therapy sessions) (see Cummings, 2014; Cunningham, 2005; Slutske, 2006). Put differently, methods of enhancing hope that do not require individuals to physically attend counselling/therapy sessions could increase the probability of individuals using such methods. This is particularly useful as governmental bodies and charities could encourage the use of such new methods in at-risk populations, which could in turn afford early intervention and prevention (higher levels of hope can serve as a buffer against maladaptive decision-making: e.g., Valle et al., 2006).

While studies have more recently focused on novel and innovative methods of fostering hope (i.e., via mobile apps), some potentially favourable methods of fostering hope, which have been suggested decades ago, have been empirically neglected. For example, Snyder (1995) suggested that hope can also be fostered via good quality sleep and healthy nutritional intake, though evidence for such relationships is still scarce. Nonetheless, exploring the relationship between healthy lifestyle habits (i.e., healthy sleep and nutritional habits) and hope can be extremely valuable as modifying these variables at individual level is not overwhelmingly difficult. That is, for individuals who may miss out on opportunities to enhance their hope levels due to their reluctance to complete counselling/therapy programs, the opportunity to achieve a similar outcome (higher hope levels) via good quality sleep and healthy nutritional habits might be favoured/welcomed, especially if individuals are educated on the benefits of good quality sleep and healthy nutritional intake (i.e., by receiving educational leaflets) and encouraged to take measures to reap the benefits (i.e., by receiving fruit and vegetable vouchers from charities/governmental bodies). Although there is little-to-no evidence for a direct relationship between sleep quality, nutritional intake and hope in the literature, there is some indirect evidence (as will be discussed in more details in Chapter 5). As an example, empirical studies reveal that good quality sleep and healthy nutritional intake are associated with higher scores on other (similar) cognitive-motivational constructs (i.e., optimism and self-esteem) (see Hingle, Wertheim, Tindle, Tinker, Seguin, Rosal & Thomson, 2014; Lemola, Raikkonen, Gomez & Allemand, 2013), which supports Snyder's (1995) suggestion that adequate sleep and healthy nutritional habits can increase hope levels. Consequently, in Chapter 5, it is proposed that good quality sleep and healthy nutritional habits could protect at-risk individuals from PG by enhancing hope levels (i.e., hope mediates the relationship between healthy lifestyle habits and PG).

While no empirical studies have examined whether sleep quality and nutritional intake can protect individuals from externalising behavioural problems (i.e., PG) via enhancing hope levels (i.e., mediation effect), there is much evidence that sleep and nutrition have a direct impact on health and well-being (e.g., Barros, Lima, Ceolim, Zancanella & Cardoso, 2019; Lee & Sibley, 2019; Utter, Dennym Lucassen & Dyson, 2016; Welch, 2001). Moreover, studies have found poor sleep quality to be related to impairments in cognitive control and increased risk-taking (see Telzer, Fuligni, Lieberman & Galvan, 2013). Similarly, empirical evidence indicates that poor nutrient intake can lead to maladaptive behaviours (see Rucklidge & Mulder, 2016). Indeed, it is increasingly being recognised that sleep quality (Berro, Frussa-Filho, Tufik & Andersen, 2014; Logan, Hasler, Forbes, Franzen, Torregrossa, Huang et al., 2018; Meijer, Reitz, Dekovic, Van Den Wittenboer & Stoel, 2010) and nutritional intake (Black, Allen, Jacoby, Trapp, Gallagher, Byrne & Oddy, 2015; Grotzkyj-Giorgi, 2009; Herbison, Hickling, Allen, O'Sullivan, Robinson, Bremner et al., 2012) are predictive of addiction and other externalising problems.

Although the majority of the current section proposes that hope and predictors of hope can make for positive intervention and prevention among at-risk populations, hope may also aid recovery in cases where gambling-related problems have already emerged (i.e., when it may be too late for prevention and intervention). One way in which individuals are able to recover from their problems (i.e., PG) is to seek help (professional and non-professional) (see Cornally & McCarthy, 2011; Gainsbury, Hing & Suhonen, 2014; Tucker, 1995), though as briefly discussed above, individuals facing problems are often reluctant to seek help due to barriers such as stigma (see Cummings, 2014; Cunningham, 2005; Slutske, 2006). However, as will be discussed in Chapters 3 and 5, the motivational component of hope (*agency thinking*) is likely to play a key role in whether (or not) an individual is able to achieve their

goal(s) in the face of barriers/obstacles (i.e., to recover from addiction via seeking help/therapy). Agency thinking is illustrated by internal speech such as 'I am not going to stop' (see Snyder, Lapointe, Crowson & Early, 1998); consequently, while stigma and other help-seeking barriers may prevent low-hope individuals from seeking help for gambling-related problems, those high in hope are unlikely to be discouraged by such obstacles. Therefore, in Chapter 5, there will be an exploration on whether hope is related to help-seeking intentions for gambling-related problems, which would indicate whether hope can aid recovery (via seeking help) in at-risk populations. While no studies have examined the relationship between hope and help-seeking intentions for gambling-related problems, a small number of studies have empirically examined the relationship between hope and help-seeking for emotional problems and suicidal thoughts (e.g., Deane, Wilson & Ciarrochi, 2001).

Precisely, to date, only three studies to date have examined some operationalisation of hope in relation to help-seeking intentions (see Uffelman, 2005). More specifically, three studies have examined the relationship between *hopelessness*, as operationalised by the Beck Hopelessness Scale (BHS: Beck, Weissman, Lester & Trexler, 1974), and help-seeking intentions. For example, Deane and colleagues (2001) found a negative correlation between hopelessness and intentions to seek help from a variety of sources (professional and non-professional); put differently, as individuals become more hopeless, they are less likely to seek formal (i.e., from mental health professional) and informal (i.e., from family and friends) help for suicidal ideation and other personal problems. Similarly, in another empirical study, Ciarrochi and Deane (2001) found a negative correlation between hopelessness and willingness to seek help for both emotional problems and suicidal thoughts. Finally, Ciarrochi, Deane, Wilson and Rickwood (2002) reported that higher scores on the BHS (i.e., higher hopelessness) were negatively correlated with intentions to seek help for

emotional problems and suicidal thoughts from parents, other family members, teachers, pastors, youth workers and doctors.

The above empirical studies indicate that hope may be related to help-seeking intentions for individuals facing suicidal thoughts and emotional problems. However, no studies to date have examined the relationship between hope (as operationalised by Snyder and colleagues: Snyder, Irving & Anderson, 1991) and help-seeking intentions for gambling-related problems. Despite the lack of research examining the relationship between Snyder and colleagues' (1991) hope scale and help-seeking intentions, the above empirical studies using the BHS indicate that some operationalisation of hope can influence willingness to seek help (e.g., Ciarrochi et al., 2002; Deane et al., 2001). Moreover, as will be discussed in more details in Chapter 5 (section 5.3), there is some indirect evidence that higher levels in hope can encourage help-seeking behaviour. For instance, studies indicate that individuals high in hope view others more positively (Snyder, Hoza, Pelham, Rapoff, Ware, Danovsky, Highberger et al., 1997), and are generally more tolerant of others (Tierney, 1995), both of which could in turn encourage high-hopers to seek help when facing problems. Therefore, in Chapter 5, there will also be an exploration on whether individuals high in hope are more likely (than low-hopers) to seek help in the event that gambling-related problems emerge.

To conclude, in the current thesis, the first aim is to offer an explanation for the inconsistencies found in the gambling literature (on the effects of arousal and mood on gambling). In so doing, there will be further support that there are two primary subtypes of gamblers: enhancement gamblers and escape-seekers (Chapter 2). A brief review of the gambling literature indicates that escape-seekers are more vulnerable to developing PG than other subtypes of gamblers (Chapter 3), which is why in the remainder of the current thesis

(Chapters 4 & 5) the focus will be on whether hope and potential predictors of hope (nutrition and sleep) protect populations resembling escape-seekers from excessive and potentially problematic gambling (or aid recovery processes in the event that gambling-related problems emerge) (see precis below for a more detailed overview of the Chapters to follow).

1.2 Overview of Chapters

1.2.1 Overview of Chapter 2: The Interplay Between Mood and Physiological Arousal: Towards a Model of Gambling Intensity

As discussed throughout the current Chapter, arousal and mood are regarded as important drivers of gambling behaviour, yet, studies investigating their effects on gambling behaviour have produced mixed results. In Chapter 2, it was hypothesised that this may be due to studies focusing on arousal and mood in isolation, neglecting possible interactions between them. In two experiments (N = 124) the interplay between mood and physiological arousal on gambling behaviour was investigated, offering evidence that the interplay between arousal and mood offers a more promising framework for changes in gambling behaviour. Findings in Chapter 2 support models and theories of PG that claim gamblers fall into two subtypes: (1) *enhancement gamblers* and (2) *escape-seekers*. Enhancement gamblers are generally in positive mood states and seek increases in arousal to reach optimal arousal levels and/or enhance positive affect. On the other hand, escape-seekers are typically in negative mood states and thus use gambling to allay negative emotions. Chapter 2 concludes by suggesting that these two subtypes of gamblers are likely to require distinct intervention and treatment programs.

1.2.2 Overview of Chapter 3: Hope as a Psychological Strength Among At-Risk Individuals

Chapter 3 reviews the gambling literature to apprehend which subtype of gambler is most vulnerable and likely to experience more severe gambling problems. A look to the literature suggested that escape-seekers (i.e., individuals who gamble to avoid/cope with problems and negative emotions) are at heightened risk of experiencing severe gambling problems. On the other hand, enhancement gamblers (i.e., individuals gambling to enhance arousal level/mood states) are likely to re-establish controlled levels of gambling with little help. Therefore, it is suggested that research should particularly focus on exploring ways in which escape-seekers could be protected from excessive gambling. A look to the literature indicates that hope, a psychological construct rooted in Positive Psychology, may improve individuals' coping efficacy and in turn reduce the need to engage in maladaptive behaviours to cope with adversities.

1.2.3 Overview of Chapter 4: Relative Deprivation and Hope: Predictors of Risk Behaviour

As concluded in Chapter 3, it is hypothesised that hope may protect at-risk individuals (i.e., individuals who gamble to escape problems and negative emotions) from problematic gambling. To put this hypothesis to test, Chapter 4 examines whether hope is related to a reduction in gambling intensity/severity among the relatively deprived (a population known to engage in risky behaviours to allay negative emotions stemming from relative deprivation). Relative Deprivation (RD) is the belief that one is in a worsen situation than similar others (i.e., neighbours), an observation that triggers negative emotions such as anger and resentment (see Crosby, 1976), which could in turn trigger engagement in risky behaviours such as excessive gambling (see Callan, Shead & Olson, 2011). Results from two

experiments (N = 106) and one questionnaire study (N = 122) indicated that hope can protect at-risk individuals (the relatively deprived) from gambling problematically. Thus, this Chapter concluded by suggesting that individuals facing adversities may benefit from attending structured programs that foster hope.

1.2.4 Overview of Chapter 5: The Benefits of Healthy Nutritional Habits, Good-Quality Sleep and Hope in Deprived Neighbourhoods

Although attending structured programs are the typical way to increase levels of hope (i.e., individuals can increase hope levels by attending the 'Making Hope Happen' program: Edwards & Lopez, 2000), there is some suggestion that good quality sleep and nutritional habits can also nurture hope. Thus, in Chapter 5, it was hypothesised that good quality sleep and nutritional intake are related to increased levels of hope, which is in turn related to reduced gambling severity among at-risk individuals; this hypothesis was examined in a questionnaire study (N = 214). Findings from this Chapter indicate that there is a relationship between nutritional intake, sleep quality and hope. Moreover, increased levels of hope were associated with decreased gambling severity among residents of deprived neighbourhoods, another population known to engage in risky behaviours to disengage from problems and their accompanying negative emotions. Furthermore, the hypothesis that hope is related to help-seeking intentions was examined in a separate questionnaire study (N = 116) in this Chapter. Consistent with predictions, a positive relationship between hope and help-seeking intentions among residents of deprived neighbourhoods was found, which suggests that in addition to potentially preventing the emergence of problems (i.e., PG), hope may also be useful if problems were to appear (i.e., aid recovery processes by encouraging help-seeking intentions).

1.2.5 Overview of Chapter 6: General Discussion

Chapter 6 begins with a summary of each Chapter in the current thesis. After a brief summary of each Chapter, in the remainder of Chapter 6, the implications of the findings and how they could encourage future research are discussed. As an example, findings indicate that hope could protect at-risk individuals from greater gambling intensity and severity, thus ways in which hope could be fostered in at-risk populations are discussed. Moreover, findings suggest that good nutritional habits and sleep quality could increase hope levels and in turn reduce PG severity, thus ways in which governmental bodies and charities could encourage healthier nutritional habits and sleep habits are discussed. In cases where findings are correlational, the need for future research to establish causality is encouraged. Finally, encouraging scholars to examine whether hope could also protect at-risk individuals from engaging in other addictive behaviours is encouraged.

2 Chapter 2: The Interplay Between Mood and Physiological Arousal: Towards a Model of Gambling Intensity

2.1 Introduction

As discussed in Chapter 1, arousal and mood are two variables that have been proposed as important predictors of gambling behaviour. More specifically, seeking increases in arousal (e.g., Brown, 1986; Mercer-Lynn et al., 2013; Schmidt et al., 2013), and avoiding/escaping negative emotions (e.g., Blaszczynski, 2000; Griffiths, 1995; Wood & Griffiths, 2007) have been posited as key motivators of gambling. However, the evidence for each of these variables as predictors of increased gambling is somewhat mixed (see Table 2.1). The inconsistencies reported in the literature may be due to researchers examining arousal and mood in isolation, that is, examining one while ignoring the other or assessing the two independently of each other. Therefore, it is posited that the interaction between arousal and mood offers a more promising framework within which to understand changes in gambling intensity. Below is a review of the evidence that supports the importance of arousal and mood in interaction, as a means of understanding increased gambling intensity.

2.1.1 Arousal and Mood in Interaction – Towards a Model of Gambling Intensity Changes

While the terms affect, emotions and mood are used interchangeably in this thesis due to referenced authors using different terms to emphasise on negative and positive states, the notion that these terms follow a pleasure-displeasure (i.e., negative and positive) dimension is always maintained throughout this thesis. Psychologists commonly use the term ‘valence’ to describe the pleasantness (positive valence) and unpleasantness (negative valence) of

emotions (see Charland, 2005a; 2005b; Frijda, 1986). As Colombetti (2005) puts it, "at present, valence is often used as affect valence – it refers to how good or bad an emotion experience, or affect, feels" (*pp*. 108). In layman's terms, valence refers to whether an emotion is bad (negative) or good (positive); thus, anger and fear are unpleasant and referred to as 'negative valence', while joy and excitement are pleasant emotions and referred to as 'positive valence' (Colombetti, 2005). Indeed, many models of affect argue that pleasantness-unpleasantness is a fundamental dimension of emotion (e.g., Russell, 1980; Russell & Mehrabian, 1977), now more commonly referred to as the 'valence dimension' (e.g., Russell, 2003; Russell & Carroll, 1999).

Table 2.1

Arousal and Mood as Predictors of Gambling Behaviour (Mixed Results in the Literature)

	Author & Year	Findings
Arousal	Schmidt, Mussel & Hewig (2013)	Schmidt and colleagues found an inverse relationship between arousal and risky behaviour.
	Mercer-Lynn, Flora, Fahlman & Eastwood (2013)	Boredom related to a desire for arousal is a unique predictor of problematic gambling behaviour.
	Dickerson, Hinchy, England, Fabre & Cunningham (1992)	Arousal is not predictive of either play rates or gambling persistence.
	Rockloff & Greer (2010)	Enhanced arousal, not under-arousal, increased gambling intensity for some.
Mood	Wood & Griffiths (2007)	Individuals use gambling to escape negative mood states.
	Rockloff, Greer, Fay & Evans (2011)	Gambling is used as a distractor from unpleasant states.
	Mishra, Morgan, Lalumière & Williams (2010)	Neither happy nor sad mood prior to gambling impacted gambling behaviour.
	Cyders & Smith (2008)	Not only did this study fail to find that negative emotional states increase gambling as commonly suggested but instead found the opposite, that is "increases in gambling are tied to positive affect" (*pp*. 6).

While valence is a major dimension of emotion, few theorists believe that it is the only dimension of affect (Russell, 1980). Although previous research examining the role of emotions on judgements, behaviour and decision-making often focused solely on the pleasure-displeasure dimension (i.e., negative and positive mood), there is growing evidence that affect has an additional influential element (see Mano, 1992). An extensive amount of research and theory indicates that affect is a multidimensional construct consisting of two primary dimensions: valence and arousal (see Reisenzein, 1994; Russell, 1980; Russell & Barrett, 1999; Russell, Weiss & Mendelsohn, 1989; Thayer, 1978; Thayer, Newman & McClain, 1994). According to Russell and Barrett (1999), both valence and arousal "are required to understand core affect" (*pp*. 810). Therefore, the inconsistencies reported in the gambling literature may be due to researchers ignoring one of the key elements of affect. For example, whether negative valence increases, or moderates gambling may be dependent on arousal levels, and whether states of under-arousal intensify or reduce gambling may be dependent on valence. This notion is consistent with Mano's (1992) argument that "negative affect accompanied by high arousal will lead to quite different judgmental processes and outcomes than negative affect and low arousal, or negative affect and intermediate arousal" (*pp*. 241).

Research from consumer psychology has also found support for the need to consider both elements of affect (valence and arousal) in decision-making studies (see Di Muro & Murray, 2012). In consumer psychology, there is a growing body of evidence that implies distinct affective states of the same valence can have different motivational implications (Garg, Inman & Mittal, 2005; Keltner, Ellsworth & Edwards, 1993; Kim, Park & Schwarz, 2010; Labroo & Rucker, 2010; Lerner & Keltner, 2000; Lerner, Small & Loewenstein, 2004; Raghunathan & Pham, 1999; Tiedens & Linton, 2001; Yi & Baumgartner, 2004; Zeelenberg & Pieters, 2004). For example, while excitement and peacefulness are both positively

valenced emotions, consumer decisions under these two emotions differ, indicating that valence alone does not influence judgments and decisions (see Kim et al., 2010). Similarly, studies have also shown that distinct affective states of the same negative valence can lead to different judgments and decisions (Keltner et al., 1993; Lerner & Keltner, 2000; Raghunathan & Pham, 1999; Raghunathan, Pham & Corfman, 2006). To elaborate, while anxiety and sadness are both negatively valenced emotions, consumers preferences under these two negative affective states differ (see Raghunathan et al., 2006).

Thus far, the evidence which indicates that valence alone does not impact judgments and decisions have been discussed, with theories and empirical studies indicating that judgments and decision are dependent on the interplay between the two primary dimensions of affect, arousal and valence (Di Muro & Murray, 2012; Lewinsohn & Mano, 1993; Mano, 1990; Mano, 1992). Therefore, it would be worthwhile to examine whether the interplay between arousal and valence explains the asymmetry in the gambling literature, especially as there is some evidence that both of affect's dimensions impact risk-taking behaviour (e.g., Mano, 1992). To understand how an interplay between arousal and valence can impact gambling behaviour, one must first understand how these two dimensions together impact subjective experience. Bradley, Codispoti, Cuthbert and Lang (2001) posit that arousal reflects the intensity of bipolar valence (i.e., strength of negative or positive mood). That is, "arousal equals the intensity or extremity of positive and negative valence" (Kuppens, Tuerlinckx, Russell & Barrett, 2013, *pp*. 920).

Theorists have long posited that arousal reflects the intensity of pleasure or displeasure (e.g., Duffy, 1957; Mandler, 1984; Schachter & Singer, 1962; Schlosberg, 1952); for example, Clore, Ortony and Foss (1987) stated that "arousal reflects little more than intensity" (*pp*. 752), while Lang (1994) also highlighted on the dual-dimensionality of affect by asserting

that “arousal is a general intensity dimension. It always has valence – either positive or negative” (*pp*. 75). Despite constant suggestions that arousal reflects the intensity of emotions, evidence for this ‘V-Shaped relation’ did not appear until the 80s (e.g., Bradley, Cuthbert & Lang, 1990; Cuthbert, Bradley & Lang, 1996; Kuppens et al., 2013; Winton, Putnam & Krauss, 1984). For instance, findings indicate that “as people feel more positive or negative, they tend to experience higher levels of arousal” (Kuppens et al., 2013, *pp*. 932). In short, arousal reflects the intensity of mood experienced by individuals. In support, empirical findings reveal that electrodermal responses (assessment of arousal) are related to self-rated pleasantness; more specifically, Winton and colleagues (1984) reported that electrodermal responses were “highest at the extremes of the pleasantness scale” (*pp*. 209).

As discussed, some theorists suggest that affect is a multidimensional construct consisting of two primary dimensions: valence and arousal (e.g., Reisenzein, 1994; Russell, 1980; Russell & Barrett, 1999; Russell et al., 1989), a notion supported by empirical research (e.g., Kuppens et al., 2013; Winton et al., 1984). Indeed, these findings “argue for caution among researchers who attempt to assess valence while ignoring arousal, to assess arousal while ignoring valence, or even to assess the two independently of each other” (Kuppens et al., 2013, *pp*. 934). Moreover, a look at the effects of mood and arousal on gambling behaviour emphasises on the need to be cautious; for example, despite a large body of research, it remains unclear whether valence (e.g., Hills et al., 2001; Mishra et al., 2010) or arousal (e.g., Blaszczynski et al., 1986; Dickerson et al., 1992) influence gambling behaviour and whether they increase or reduce gambling (e.g., Rockloff et al., 2007; Rodda et al., 2004; Schmidt et al., 2013; Wohl et al., 2008). Similar inconsistencies have been reported when examining the influence of affect’s two dimensions on memory (Cook, Marsh, Clark-Foos & Meeks, 2007; Mather & Nesmith, 2008), vision (Lane, Chua & Dolan, 1999), judgment and decision-making (e.g., Blanchette & Richards, 2010; Di Muro & Murray, 2012) and so on. Therefore,

it is posited that the role of arousal and mood on gambling behaviour may have produced mixed results as these two variables have often been examined independently of one another.

As a possible means of resolving the inconsistencies between studies, this Chapter will examine whether arousal and valence in interaction offers a more promising framework within which to understand motives for increased gambling. Prior to doing so, a look back to the gambling literature can depict what to expect. Despite the inconsistencies in the gambling literature, an overwhelming majority of empirical evidence indicates that negative emotions (e.g., Matthews et al., 2009; Wood & Griffiths, 2007) and states of under-arousal (e.g., Brown, 1986; Schmidt et al., 2013) encourage gambling behavuiour. Likewise, prominent pathway models of gambling argue that the need to escape negative emotions or increase arousal levels incite PG (e.g., Blaszczynski & Nower, 2002; Lesieur, 2001; McCormick, 1988). For instance, Cooper, Agocha and Sheldon's (2000) pathway model claims that there are two distinct motives for gambling: (1) gambling to cope with and/or escape unpleasant states (which they call 'coping motives'), and (2) gambling to pursue or enhance positive affect (which they call 'enhancement motives'). Cooper and colleagues (2000) expand on this by revealing that "negative emotionality primarily drives coping motives, whereas positive emotionality primarily drives enhancement motives" (*pp*. 1060).

Empirically, Goldstein et al. (2014) found support for their hypothesis that "coping motives (i.e., gambling to relieve negative mood) would moderate the relationship between negative mood and gambling, whereas enhancement motives (i.e., gambling to enhance positive mood) would moderate the relationship between positive mood and gambling" (*pp*. 224). This line of thought suggests that gambling for increases in arousal is only applicable for individuals who wish to enhance their positive affect; increases in arousal level intensify mood states (see Kuppens et al., 2013), thus one way in which individuals under positive

mood can enhance their mood is by seeking increases in arousal level, which gambling affords. On the other hand, for individuals under negative mood states, the motive for gambling derives from the desire to cope with/escape aversive states; indeed, gambling enables individuals to temporarily disengage from problems and negative feelings (escape from reality and day-to-day problems: e.g., Wood & Griffiths, 2007), thus making gambling an attractive activity for individuals seeking to cope with/escape negative emotions.

In short, for individuals seeking mood enhancement, increases in arousal/excitement can positively reinforce ongoing gambling, while for individuals under negative emotions, the temporary disengagement from aversive states can negatively reinforce continuous gambling. Empirically, Stewart and colleagues (2008) revealed that some individuals gamble purely for positive reinforcement (which they labelled 'enhancement gamblers') while others gamble mainly for negative reinforcement (which they labelled 'coping gamblers'). Although the terms given for the two subtypes of problem gamblers may differ, Stewart et al. (2008) highlighted that their "subtyping scheme shows many similarities to those previously suggested in the literature" (*pp*. 266). For example, coping gamblers are similar to subtypes of gamblers previously referred to as 'escape-seekers' (Lesieur, 2001), 'recurringly depressed' (McCormick, 1988), and 'emotionally vulnerable' (Blaszczynski & Nower, 2002) because the motive for gambling for these subtype of gamblers is to avoid/escape aversive states. On the other hand, enhancement gamblers are similar to subtypes of gamblers previously referred to as 'impulsive action seekers' (Lesieur, 2001), 'chronically understimulated' (McCormick, 1988), 'boredom prone' (Blaszczynski et al., 1990), and 'behaviourally conditioned' (Blaszczynski & Nower, 2002) because these subtypes of gamblers use gambling as a means of increasing arousal levels and enhancing their mood.

Based on models of gambling and empirical research discussed above, motives for gambling is primarily dependent on emotional valence. More specifically, it is widely claimed that under positive emotional valence, individuals engage in gambling to enhance positive affect, while under negative emotional valence, engagement in gambling derives from individuals' need to cope with/escape aversive states (e.g., Cooper et al., 2000; Goldstein et al., 2014; Stewart et al., 2008). Therefore, it is logical that empirical studies examining the role of arousal on gambling produce mixed results. To elaborate, under positive emotional valence, individuals are able to enhance their mood via increases in arousal level (see models of affect that indicate arousal reflects intensity of mood: i.e., Clore et al., 1987; Duffy, 1957; Lang, 1994; Mandler, 1984; Schachter & Singer, 1962; Schlosberg, 1952), thus it is logical that enhancement gamblers (i.e., individuals under positive states) gamble to increase arousal levels, which may explain findings that under-aroused individuals are likely to gamble excessively (e.g., Brown, 1986; McCormick, 1988). However, under negative emotional valence, individuals are unlikely to desire increases in arousal as heightened arousal under negative affect will intensify the negative emotion, which would explain why some studies fail to find a relationship between arousal and gambling (e.g., Dickerson et al., 1992). This suggests that arousal and valence in interaction may offer a more promising framework within which to understand changes in gambling behaviour.

Some studies have reported that heightened arousal levels, not states of under-arousal, increase gambling (e.g., FeldmanHall et al., 2016). Again, an interplay between arousal and valence can explain these findings. As previously stated, increases in arousal intensify mood states, thus for individuals under negative mood states, as arousal increases, so does the severity/unpleasantness of the mood (see Kuppens et al., 2013), consequently, individuals under more severe negative states are more desperate/eager to avoid/escape negative emotions than individuals under less severe negative states. Accordingly, as arousal increases

under negative mood states, so should the desire to cope with/escape aversive states (which gambling affords); consistent with findings that heightened arousal levels, instead of states of under-arousal, encourages gambling behaviours (e.g., FeldmanHall et al., 2016; Phelps et al., 2014). In sum, mixed results on the effects of emotions and arousal on gambling may be due to studies examining valence while ignoring arousal or vice versa, that is, failing to examine the two primary dimensions of affect in interaction.

Considering the literature discussed thus far, one could predict that changes in gambling behaviour will depend on both elements of affect: valence and arousal. While the valence dimension of affect will shape individuals' motives (i.e., whether an individual's motive for gambling is to enhance positive affect or escape aversive states), the arousal dimension of affect will reflect the desire/eagerness to pursue that particular motive. For example, research indicates that during negative mood states, the motive for gambling derives from desires to cope with and/or escape unpleasant states (Taber, McCormick & Ramirez, 1987; Wood & Griffiths, 2007), therefore, as negative mood intensifies (i.e., mood worsens), so should the desire to gamble. As increases in arousal reflect intensity of mood states (see Kuppens et al., 2013), it can be posited that under negative affect, increases in arousal will encourage gambling (i.e., increase gambling intensity). During positive mood states, the motive for gambling derives from desires to enhance positive affect (Goldstein et al., 2014; Stewart et al., 2008), thus, individuals with lower/moderate levels of positive affect should be more eager to enhance their mood than individuals already in enhanced mood states. Therefore, it can be predicted that under positive affect, increases in arousal will reduce gambling as heightened arousal under positive affect implies that individuals are already under enhanced positive affect (arousal reflects the intensity of mood).

The prediction that increases in arousal level under positive mood states will reduce gambling intensity is also consistent with the Mood Maintenance Hypothesis (MMH: Isen & Patrick, 1983). The MMH asserts that individuals in elated moods are motivated to maintain positive moods and thus take little-to-no risk. In support of the MMH, prior research has demonstrated that people tend to make decisions that maintain positive moods (e.g., Isen, 1987; Kim et al., 2010; Larsen, 2000; Mayer & Salovey, 1995). In which case, it is logical to posit that as positive mood enhances/intensifies via increases in arousal (see Kuppens et al., 2013), so would the desire to maintain the elated mood, which is consistent with the hypothesis that increases in arousal levels during positive mood states will reduce desires to gamble.

2.1.2 Current Study

The aim of the current study was to induce either negative or positive emotional valence prior to gambling, while also measuring physiological arousal to investigate the influence of both variables in interaction on gambling intensity. This approach allows us to test whether an interplay between arousal and valence is a promising framework for understanding changes in gambling intensity; this is the only experimental study to date to test the interplay between arousal and valence as a model of gambling intensity changes. Empirical studies often demonstrate that individuals gamble to avoid/escape unpleasant states (e.g., Wood & Griffiths, 2007), thus leading to the hypothesis that as the severity of negative affect increases (i.e., via increases in arousal), so will desires to avoid/escape aversive states. Thus, under negative mood states, one expects increases in arousal to increase gambling intensity. Studies also assert that some individuals gamble to enhance positive affect (e.g., Stewart et al., 2008), thus it is hypothesised that as intensity of positive affect increases (i.e., via increases in arousal), the desire to enhance mood will reduce; put differently, individuals experiencing the

least amount of positive affect will have stronger desires to enhance their mood. Consequently, under positive mood states, one expects increases in arousal to reduce gambling intensity.

Increased gambling intensity is any form of play that increases losses over long-run play (Rockloff & Dyer, 2007); for example, riskier odds (i.e., 'long odds') and faster gambling speed are both assessments of gambling intensity as both variables increase the number of losses over time. Increased gambling intensity has been associated with PG (e.g., Häfeli & Schneider, 2005); more specifically, gambling at greater speeds (see Delfabbro, Osborn, McMillen, Neville & Skelt, 2007; Häfeli & Schneider, 2005) and riskier odds (see LaBrie & Shaffer, 2011; Xuan & Shaffer, 2009) are common gambling behaviours among problem gamblers. One way in which increased gambling intensity can lead to PG is through loss-chasing behaviour (see Lesieur, 1979). For example, long/risky odds increase the chance of incurring losses; such losses may in turn lead to loss-chasing behaviour, that is, encourage gamblers to make up for losses by wagering more money, taking greater risks, playing for a longer period of time and/or playing more frequently, all of which are considered to be at the core of PG (see Breen & Zuckerman, 1999; Lesieur, 1984; Rickwood, Blaszczynski, Delfabbro, Downling & Heading, 2010). Likewise, faster gambling play increase the number of losses over time (see Rockloff & Dyer, 2007), in turn inciting loss-chasing behaviour and eventually PG (see Harris & Griffiths, 2018).

Below the interaction between arousal and valence on both gambling speed (Experiment 1) and risk-taking (Experiments 1 and 2) is examined, as both of these have been shown to increase gambling losses over time and are thus viewed as behaviours that encourage PG. Both Experiments 1 and 2 include impulsivity, greed, gender and PG severity as covariates in the analyses as these variables have also been shown to influence risk-taking and gambling

intensity (see Joukhador, Blaszczynski & Maccallum, 2004; Michalczuk, Bowden-Jones, Verdejo-Garcia & Clark, 2011; Mussel, Reiter, Osinsky & Hewig, 2015; Wong, Zane, Saw & Chan, 2013).

2.2 Experiment 1

It is hypothesized that changes in gambling intensity are dependent on both the valence (negative or positive) and intensity/severity (level of arousal) of a person's affective state. More specifically, a positive correlation between arousal and gambling intensity under negative mood state and an inverse correlation under positive mood state is predicted. To put the hypotheses to test, this Chapter explored whether emotional valence (experimentally induced negative or positive mood) and arousal in interaction predicted changes in gambling intensity. In Experiment 1, the Columbia Card Task (CCT: Figner, Mackinlay, Wilkening & Weber, 2009) was used to assess (1) the speed at which participants took risks (gambling speed), and (2) how riskily participants played the game (risk-taking).

2.2.1 Methods

Participants

Fifty-eight participants were initially recruited from the student population on the university campus. Data from 10 participants were excluded from analyses; seven of those participants had more than 280 total clicks (i.e., turning over approximately 90% of the cards) by the end of the Columbia Card Task (CCT) and/or turned over 30 cards in three consecutive rounds and had therefore noticed the CCT was rigged; one participant who had less than 30 total clicks (i.e., turning over approximately 10% of the cards) by the end of the CCT was excluded; and two participants withdrew from the study. The remaining forty-eight (37

females and 11 males) students' data were included in the analyses. All forty-eight students were Psychology students recruited via a volunteer participant credit system; participants' age ranged from 18 – 22 years old (M = 19.65, SD = 1.06).

Design

This experimental study used a between-subjects design to investigate the effects of physiological arousal under different affective states (negative vs. positive) on (1) seconds per click (assessment of gambling speed) and (2) total number of clicks (assessment of risk-taking). Video clips were used to induce different mood states (negative or positive); The Self-Assessment Manikin (SAM) was used to assess mood. Risks taken and speed of risk-taking during the CCT were used to assess participants' gambling intensity, while physiological arousal was assessed by the means of Electrodermal Activity (EDA). Also, participants' gender, impulsivity score as assessed by the UPPS-P scale, greed (assessed via the Dispositional Greed Scale: DGS) and Gambling Severity (assessed via the Problem Gambling Severity Index: PGSI) were used as covariates in the analyses as these variables have also been shown to influence risk-taking and gambling intensity.

Materials

Video clips

Two video clips with a duration of approximately four minutes and 30 seconds were used to induce different affective states. A comedy video clip and a video clip on the tragedy in Syria were used to induce positive and negative affective states respectively.

Impulsivity

The UPPS-P scale was used to assess participants' impulsivity (Whiteside & Lynam, 2001). The scale has five subscales: (1) negative urgency refers to the tendency to act rather rashly

and impulsively under conditions of negative affect; (2) positive urgency refers to the tendency to behave impulsively under conditions of positive affect; (3) (lack of) premeditation is the failure to think and reflect on the consequences of an action before acting; (4) (lack of) perseverance is the failure to remain focused on tasks that may be considered as boring, long and/or difficult; and (5) sensation seeking is the tendency to pursue new exciting activities (that may be unsafe) or an openness to trying new activities that may or may not be dangerous. The scale consists of 59 items using a four-point Likert-type scale (1 = agree strongly – 4 = disagree strongly). Higher scores indicate higher levels of self-reported impulsivity. Adding the subscales provides a total impulsivity score. Cronbach's α for this scale was 0.87.

Mood

Participants' mood was assessed using the 9-item Self-Assessment Manikin (SAM: Bradley & Lang, 1994), a non-verbal pictorial technique that assesses mood associated with a person's response to a wide variety of stimuli. The SAM consists of 9 pictures showing emotional faces arranged in a linear sequence (1st picture = most negative face - 9th picture = most positive face); participants select the emotional face that best represents their affect. The SAM is regarded as an "easy method for quickly assessing reports of affective response in many contexts" (Bradley & Lang, 1994, *pp*. 49), majorly due to its simplicity in comparison to other widely and frequently used scales that require ratings across multiple items (e.g., 20 items on the Positive and Negative Affect Schedule: see Watson, Clark & Tellegen, 1988). Thus, the SAM was more appropriate for this experiment, where participants were asked to rate their mood on several occasions (e.g., before and after the mood-induction videos).

Physiological Arousal

Participants' physiological arousal was assessed via Electrodermal Activity (EDA): Skin Conductance (SC: in micro Siemens (μS)) was assessed throughout the experiment via the BIOPAC MP150. SC is the best indicator of strong emotional responses and a sensitive assessment of emotional intensity (e.g., Andreassi, 2010; Rickard, 2004); Rickard (2004) argues that "SC may be regarded as a more pure measure of emotion intensity than other physiological measures" (*pp*. 382). SC increases in a linear fashion with increasing affective intensity (Bradley & Lang, 2000). Two electrodes (with gel applied) were placed on the middle and index finger (data were recorded on the AcqKnowledge 4.1 software). Mean SC (μS) throughout the mood induction videos were used in analyses, which is a common method used to assess physiological arousal in studies using video clips for manipulation (see van Bruinessen, van den Ende, Visser & Dulmen, 2016).

Gambling Task

The Columbia Card Task (CCT: Figner et al., 2009) was used to assess participants' gambling speed and risk-taking. The CCT has been used in both risk-taking (e.g., Buelow & Blaine, 2015; Panno, Lauriola & Figner, 2013) and gambling research (e.g., Donati, Chiesi & Primi, 2015) and is one of the few risk tasks that assesses speed of play, thus making it an appropriate task for the current study. Moreover, based on a review of several traditional gambling games (i.e., blackjack and roulette) and risk tasks (i.e., the CCT) commonly used in the literature, Rahn (2012) stated that the following criteria are crucial for a gambling task: "the task needs to require participants to make a choice under uncertainty, probabilities must be distributed clearly, and there are better and worse outcomes, providing a risk premium for those who decide to continue playing. Finally, participants must also comprehend the game,

which can be a challenge with more complex tasks" (*pp*. 9); indeed, as discussed below, the CCT possesses all the characteristics to qualify as a gambling task.

The CCT presents participants with the chance to earn points by turning over cards. Each round starts with a total of 32 cards facing down; participants can turn over one card at a time and receive immediate feedback (whether the card is a gain card – one with a smiley face, which gains points – or a loss card – one with a frowning face, which deducts points). On the participant's screen, they were able to view the total number of cards (turned-over and not), the number of loss cards that were amongst the deck, and the amount of points for each gain card and loss card. A game round will continue until participants either decide to click 'stop' or turn over a loss card which leads to a large loss of points and an automatic end to that game round. With each gain card turned over, participants are able to gain more points, though as more cards are turned over, the higher the chance of participants turning over a loss card.

The CCT was programmed so that the last two cards to be revealed were the two hidden loss cards. Because the key assessment of interest in this experiment was the number of cards participants turn over before voluntarily stopping (indicative of risk-taking), being stopped involuntarily due to a loss turnover by chance would not have been as informative as participants voluntarily stopping when they themselves perceived the probability of turning over a loss card was high (high risk). However, in order to maintain the impression that participants were playing a game of chance there were three additional high loss-probability trials randomly interspersed among the ten test trials (these trials were programmed to contain a loss card between the 2nd to the 9th card). In summary, all participants faced the same game condition, that is, two loss cards hidden amongst 32 cards, 20 points gained for

each gain card turned over and 750 points deducted for each loss card turned over. All participants were assigned to this one game condition ten times, supplemented by three high loss-probability trials, making a total of 13 trials, that is ten experimental trials and three non-experimental trials.

Gambling Assessment Tool

The problem gambling severity index (PGSI: Ferris & Wynne, 2001) is an assessment tool that was constructed to assess problem gambling in the general population. The PGSI is a nine-item instrument; four of the nine items assess problem gambling behaviours: (1) have you bet more than you could really afford to lose? (Bet); (2) have you needed to gamble with larger amounts of money to get the same feeling of excitement? (Tolerance); (3); when you gambled, did you go back another day to try to win back the money you lost? (Chase); and (4) have you borrowed money or sold anything to get money to gamble? (Borrowed). The other five items assess adverse consequences of gambling, for example, have people criticized your betting or told you that you had a gambling problem? (Criticized); has gambling caused you any health problems, including stress or anxiety? (Health problems) and so on. Each of the nine items require respondents to answer on a four-likert scale (0 = never, 1 = sometimes, 2 = most of the time, 3 = almost always). The total score will define whether respondents have no gambling problem (score of 0); low level of problems with few or no identified negative consequences (score of 1 or 2); moderate level of problems leading to some negative consequences (3 to 7); or problem gambling with negative consequences and a possible loss of control (score of 8 or more). Ferris and Wynne (2001) reported the reliability of the PGSI with both a respectable internal consistency (α = .94) and a good test-retest reliability (r = .78).

Typically, absolute PGSI scores are converted into four categories (no-problem, low-risk, moderate-risk and problem gambling) and are treated as a continuous evaluation of problem gambling severity (see Currie, Hodgins & Casey, 2013). However, the numerical scoring system of the PGSI is more consistent with the characteristics of an ordinal scale than a ratio scale (i.e., the equivalency between scale points is not assumed). Therefore, the range of scores for each category varies considerably; a 1-point range is used for the non-problem gambling category, a 2-point range for the low-risk, a 5-point range for the moderate-risk and a 19-point range for the problem gambling category, which could impact the temporal stability of the PGSI classifications (Currie et al., 2013). Nevertheless, evidence suggests that the PGSI is psychometrically stronger than similar screening tools including the South Oaks Gambling Screen (SOGS), the Victorian Gambling Screen and DSM-IV based scales (McMillen & Wenzel 2006; Orford, Wardle, Griffiths, Sproston & Erens, 2010). Thus, as recommended, the PGSI is converted to a categorical variable for analyses.

Greed

The Dispositional Greed Scale (DGS: Seuntjens, Zeelenberg, Van de Ven & Breugelmans, 2015) was used to assess participants' greed. The scale consists of seven items (e.g., "I always want more", "actually, I'm kind of greedy" and "one can never have too much money") where responses are collected through a five-point Likert-type scale (1 = strongly disagree – 5 = strongly agree); higher scores indicate higher levels of greed. Cronbach's α for this scale was 0.82.

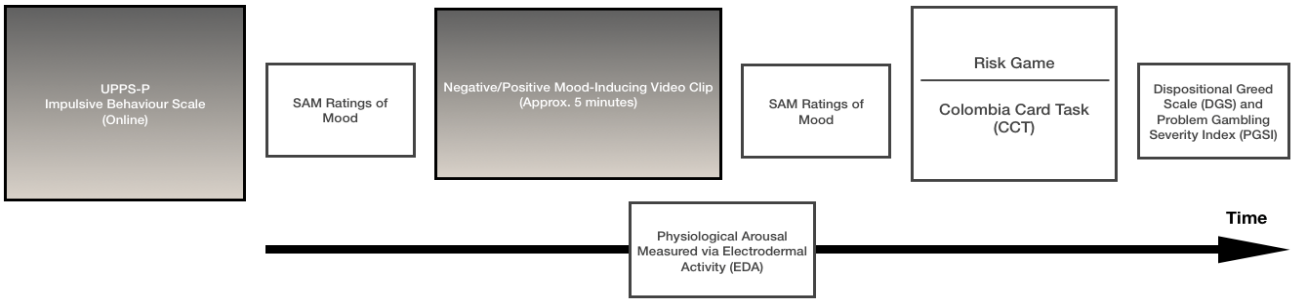
Procedure

All participants who signed up for the experiment were asked to complete the UPPS-P Impulsive Behaviour Scale online (prior to coming to the laboratory); this was to ensure that

participants were equally matched across conditions (total impulsivity scores were used to match participants). Once participants had given consent, they were asked to complete the Self-Assessment Manikin (SAM) to assess their mood. After completing the SAM, two electrodes were attached to the middle and index fingers of the participant's non-dominant hand to assess EDA (physiological arousal) until the end of the CCT, at which point the electrodes were detached. Participants were then asked to watch a video clip (negative/positive mood-induction), then mood was assessed again using the SAM. Participants then played 13 rounds of the CCT for real monetary incentives calculated as £1 for every 1000 points gained. At the end of the CCT, participants were asked to complete a short questionnaire (age and gender) (see Appendix A) followed by the PGSI and the DGS. Before participants were debriefed and thanked for their participation, they were made aware of the amount of points they earned during the CCT and therefore how much money they could potentially win; participants were only paid if they rolled a chosen number (1-6) on a die. See Figure 2.1 for a diagram of the experimental timeframe.

Figure 2.1

Timeline of Experiment



Data Analyses

The outcome variables were (a) seconds per click (assessment of gambling speed) and (b) total number of clicks (assessment of risk-taking). Both of these dependent variables are behaviourally indicative of long-run gambling losses (gambling intensity).

A Pearson's correlation coefficient was computed to assess the relationship between physiological arousal during the video clip and throughout the CCT. There was a positive correlation between the two variables, $r = .896$, $p = .001$. Due to multicollinearity ($r > .8$; *tolerance* < .1; and *VIF* > 10), physiological arousal during the CCT was excluded from all regression models; all other predictor variables met the assumptions. Therefore, analyses were conducted for each of the outcomes using a three-stage hierarchical regression model, with gender, greed, problem gambling severity and impulsivity entered at stage one of the hierarchical model; physiological arousal (during the video clip; i.e., prior to playing the CCT) and condition (negative vs. positive mood state) were entered at stage two of the hierarchical model; and finally, the interaction variable (condition X physiological arousal) was entered at stage three of the hierarchical model; the rejection level for all analyses was set at $p = .05$.

2.2.2 Results

Manipulation check

A one-way ANOVA indicated that there was no difference in mood for the two groups (negative and positive) before watching the mood-inducing video clips, t (46) = 0.44, $p = .659$. A mixed-design ANOVA was used to analyse participants' mood (from the SAM) before and after watching the negative or positive mood-inducing video clip. As predicted, mood before the video clip was significantly different to mood after the video clip, F (1, 46)

= 22.65, p = .001, ηp^2 = *.33* and mood was significantly different across the two conditions, F (1, 46) = 31.99, p = .001, ηp^2 = *.41*. A significant interaction suggest that the differences are due to the post-video mood scores, F (1, 46) = 46.03, p = .001, ηp^2 = .50 (see Table 2.2 for descriptive statistics).

Table 2.2

Mean (M) and Standard Deviation (SD) of Mood Before and After Manipulation

	Before Video Clip		After Video Clip	
	M	*SD*	*M*	*SD*
Negative Mood Induction	6.54	0.93	4.17	1.31
Positive Mood Induction	6.42	1.02	6.83	0.92

Gambling Speed (Seconds per Click)

A three-stage hierarchical regression was conducted with seconds per click as the outcome variable. The covariate variables gender, greed, problem gambling (PGSI) and impulsivity were entered at stage one of the regression model. The predictor variables physiological arousal and condition (negative vs. positive affective state) were entered at stage two of the regression and one interaction variable (condition X physiological arousal) was computed and entered at stage three. Significant regression model indicates that physiological arousal has the opposite effect on seconds per click under opposite mood states (negative vs. positive); the regression statistics are in Table 2.3 (see Figure 2.2).

Table 2.3

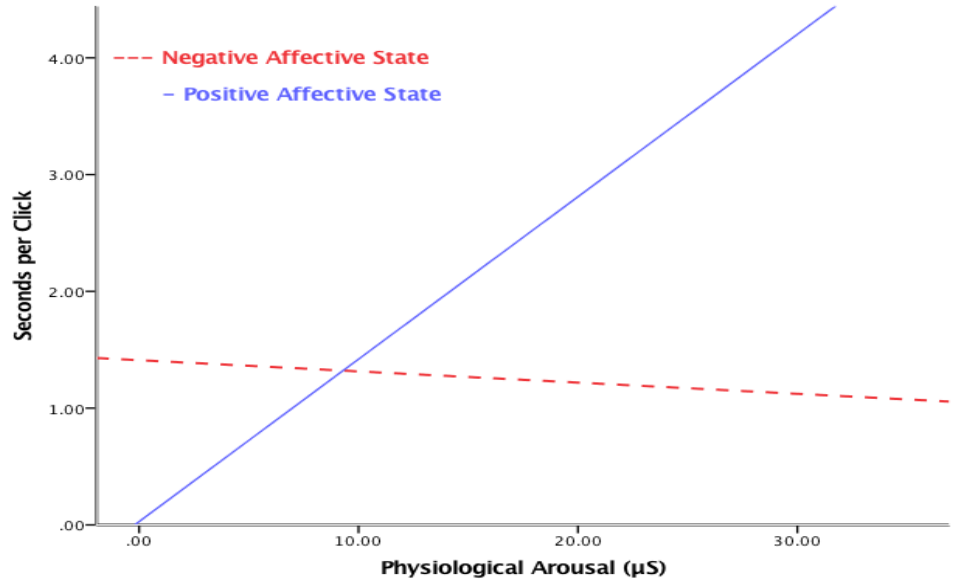
Summary of Hierarchical Regression Analysis for Variables Predicting Seconds per Click

Variable	*β*	*t*	*SE*	*R*	R^2	ΔR^2	*F*	*ΔF*	*ΔF p*	*p*
Model 1 *				**.51**	**.26**	**.26**	**3.69**	**3.69**	**.011**	**.011**
Gender **	-0.41	-3.10	0.20							.003
Greed	-0.20	-1.43	0.02							.161
PGSI *	0.30	2.08	0.09							.043
Impulsivity	-0.03	-0.23	0.01							.822
Model 2 *				**.53**	**.28**	**.03**	**2.66**	**0.70**	**.503**	**.029**
Gender **	-0.43	-3.16	0.20							.003
Greed	-0.21	-1.50	0.02							.142
PGSI *	0.31	2.09	0.09							.043
Impulsivity	-0.02	-0.13	0.01							.901
Arousal	0.02	0.16	0.02							.873
Condition	-0.16	-1.13	0.17							.264
Model 3 **				**.67**	**.45**	**.17**	**4.62**	**12.07**	**.001**	**.001**
Gender **	-0.36	-2.95	0.18							.005
Greed	-0.24	-1.92	0.02							.062
PGSI *	0.36	2.71	0.08							.010
Impulsivity	-0.08	-0.63	0.01							.533
Arousal	-0.18	-1.32	0.02							.195
Condition	-0.11	-0.89	0.15							.379
Condition X Arousal ***	0.47	3.47	0.04							.001

*Note. Arousal refers to the average physiological arousal (μS) of participants throughout the video clip (prior to playing the CCT); N = 48; * p < .05; ** p < .01; *** p < .001*

Figure 2.2

Effect of Arousal on Seconds per Click Under Negative and Positive Affective States



Risk-Taking (Total Number of Clicks)

Similarly, a three-stage hierarchical regression was conducted with total clicks as the outcome variable. The covariate variables gender, greed, problem gambling (PGSI) and impulsivity were entered at stage one of the regression model. The predictor variables physiological arousal and condition (negative vs. positive affective state) were entered at stage two of the regression and one interaction variable (condition X physiological arousal) was computed and entered at stage three. Although the pattern of findings is consistent with predictions (see Figure 2.3), results are non-significant (see Table 2.4 for regression statistics).

Table 2.4

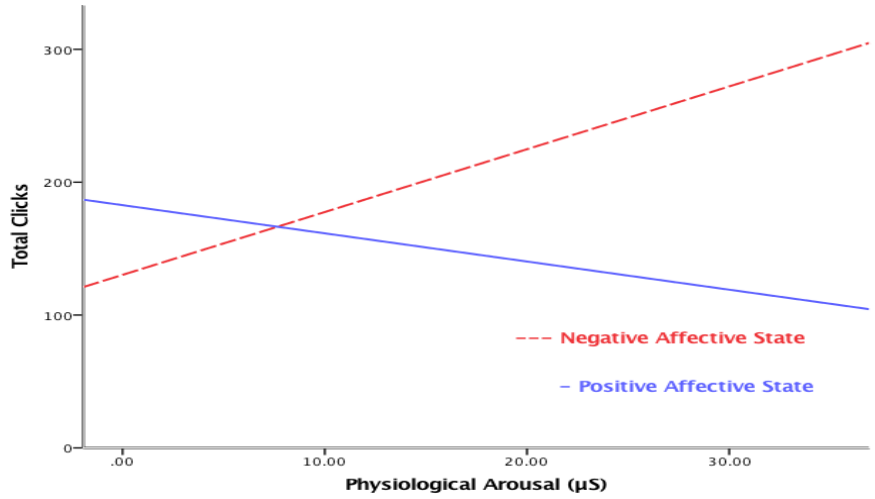
Summary of Hierarchical Regression Analysis for Variables Predicting Total Clicks

Variable	β	t	SE	R	R^2	ΔR^2	F	ΔF	$\Delta F\ p$	p
Model 1				**.32**	**.10**	**.10**	**1.20**	**1.20**	**.327**	**.327**
Gender	0.22	1.48	22.11							.145
Greed	0.10	0.64	2.55							.526
PGSI	-0.10	-0.66	10.06							.514
Impulsivity	0.21	1.33	0.51							.191
Model 2				**.42**	**.18**	**.08**	**1.49**	**1.98**	**.152**	**.205**
Gender	0.24	1.69	22.10							.100
Greed	0.13	0.82	2.53							.415
PGSI	-0.15	-0.96	10.01							.345
Impulsivity	0.20	1.23	0.50							.224
Arousal	0.28	1.92	2.07							.061
Condition	-0.03	-0.19	18.80							.847
Model 3				**.47**	**.22**	**.04**	**1.61**	**2.11**	**.154**	**.160**
Gender	0.21	1.45	22.09							.154
Greed	0.14	0.93	2.50							.357
PGSI	-0.18	-1.12	9.94							.271
Impulsivity	0.23	1.44	0.50							.157
Arousal *	0.38	2.38	2.26							.022
Condition	-0.05	-0.35	18.66							.726
Condition X Arousal	-0.23	-1.45	5.15							.154

*Note. Arousal refers to the average physiological arousal (μS) of participants throughout the video clip (prior to playing the CCT); N = 48; * p < .05*

Figure 2.3

Effect of Arousal on Total Clicks Under Negative and Positive Affective States

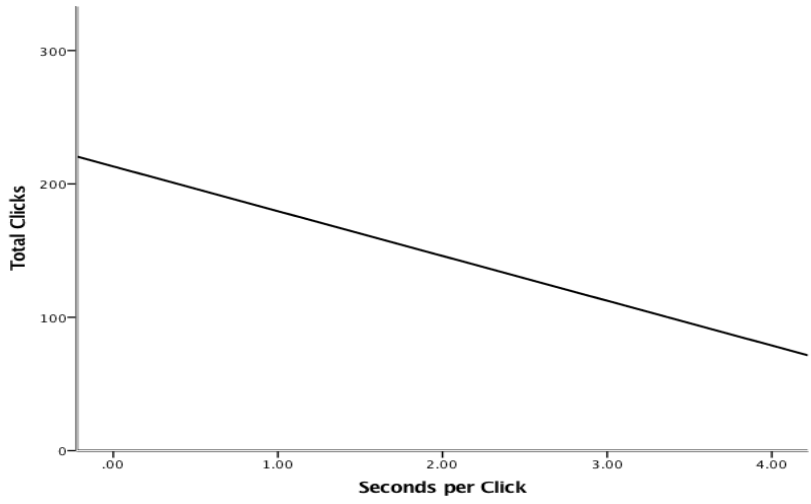


Seconds per Click and Total Number of Clicks

A linear regression analysis was conducted to test whether (or not) participants who gambled faster did so in an attempt to leave the laboratory as quick as possible. The results of the regression indicated that the predictor (seconds per click) significantly predicted total clicks, where 11% of the variance was explained by the predictor variable; (R^2 = .11, F (1, 46) = 5.44, p = .024) (see Figure 2.4).

Figure 2.4

Seconds per Click on Total Number of Clicks



2.2.3 Discussion

It is hypothesized that the interplay between arousal and valence (negative and positive mood states) may explain changes in gambling intensity (gambling speed and risk-taking). More specifically, it is expected that higher arousal levels during a negative affective state would increase gambling intensity, whereas, higher arousal levels during positive mood states would reduce gambling intensity. As predicted, significant results reveal that the interplay between arousal and mood offers a more promising framework for understanding changes in gambling intensity than examining arousal or mood in isolation. More specifically, a significant interaction effect indicates that during positive affective states, increases in physiological arousal decrease gambling speed, whereas during negative mood states, elevations in arousal level increase gambling speed (see Figure 2.2).

Experiment 1 also examined whether arousal and mood in interaction predicted changes in risk-taking (total number of clicks). Although Figure 2.3 shows the same pattern of results for risk-taking, that is, a positive correlation between arousal and risk-taking during negative mood states and an inverse correlation between arousal and risk-taking during positive mood states, these results were non-significant and thus reveal that an interplay between arousal and valence does not predict risk-taking. The design of the risk task could be one possible reason for the regression model not reaching significance despite following the predicted pattern. To elaborate, the CCT was programmed so that the two loss cards were the last two cards to be turned over in ten out of thirteen rounds. Accordingly, incurring few losses could have led participants to underweight the probability of losing, consequently taking greater risks by turning over more cards. Therefore, failing to find a significant interaction effect could be due to participants' experience encouraging them to turn over more cards irrespective of their mood states and arousal level. This explanation is consistent with Hertwig, Barron, Weber and Erev's (2004) findings that "underweighting of rare events is

likely to emerge in decisions from experience even if people can provide accurate explicit estimates of the probabilities" (*pp*. 538).

Finally, analysis was conducted to investigate whether (or not) participants who gambled faster did so in an attempt to leave the laboratory as quick as possible. Results indicate that although participants had the option to turnover less cards in each round (or no cards at all), they did not take this option, thus ruling out the notion that individuals gambled faster so that they are able to leave the laboratory as soon as possible; to the contrary, results indicate that participants who gambled faster also turned over more cards (see Figure 2.4). In summary, consistent with predictions, results from Experiment 1 indicate that under positive mood states, physiological arousal is inversely correlated with gambling speed, whereas, under negative mood states, physiological arousal is positively correlated with gambling speed. Although a similar pattern when investigating the effects of arousal and mood on risk-taking was found, the regression model failed to reach significance. One possible reason for the failure to reach significance is that participant's experience during the CCT may have encouraged increased risk-taking. To elaborate, the CCT was designed so that the last two cards were the two hidden loss cards in ten out of thirteen rounds, thus participants experienced far more wins than losses, and this may have encouraged participants to take more risks, in turn influencing the results.

2.3 Experiment 2

Following the results of Experiment 1, there were concerns that the CCT may have not been as appropriate for measuring risk-taking as it was for measuring gambling speed. The CCT was programmed so that the two loss cards were the last two cards to be turned over in the ten experimental trials; this was done as participants being stopped involuntarily due to a loss turnover by chance would not have been as informative as participants voluntarily stopping

when they perceived the probability of turning over a loss card as too risky. Programming the CCT in such a way meant participants experienced far more wins than losses, and this pleasant experience with the CCT could have encouraged participants to take greater risks, which may have in turn led to results failing to reach significance (see Hertwig et al., 2004 for empirical evidence in support of this notion). For these reasons, in Experiment 2 a novel task to assess risk-taking was employed, a task similar to real-world gambling games and one that ensures participants experience as many loss rounds as successful ones.

In many real gambling games, gamblers are required to make a decision on how much to *wager* and what odds to select, which would in turn reveal how much the bettor is to receive if s/he wins (known as *potential return*). Therefore, once participant's wager is controlled for, potential returns will identify how risky participants were in their gambling (higher potential returns indicate greater risk-taking), as such, from this point on, potential returns may be referred to and labelled as *risk-taking.* As in Experiment 1, it was hypothesized that mood and physiological arousal in interaction will predict changes in gambling intensity.

2.3.1 Methods

Participants

Eighty-two participants were initially recruited from the student population on the university campus via a volunteer participant credit system. Data from six participants were excluded from analyses; two of those participants stated that they noticed the task was rigged; one participant was excluded as EDA was not detected; and three participants' data was excluded as they failed to pass the task-comprehension questionnaire, which indicated that they did not understand the task. The remaining seventy-six (60 females and 16 males) students' data were used for analyses; ages ranged from 18 - 34 years old (M = 20.55, SD = 3.26).

Design

As in Experiment 1, this experiment used a between-subjects design to investigate the effects of physiological arousal (prior to gambling) under different affective states (negative vs. positive) on risk-taking.

Materials

Experiment 2 employed the same video clips, impulsivity scale, mood scale, the BIOPAC software to assess EDA, the PGSI and the DGS as in Experiment 1. However, a different task was used to assess participant's risk-taking, and, a task-comprehension questionnaire was also used to assess participants understanding of the novel risk game.

Risk Game

The task used to assess participants' risk-taking is a novel game that was created on UNITY software. In the game, a cannon fires a ball which could land anywhere between 0 to 100 meters from the canon (see Figure 2.5). Prior to the cannon firing the ball, participants were asked to place a bet on where they think the ball will land, In this experiment, they were given three risk options to choose from in each round: (1) high risk (20/1 odds), medium risk (10/1 odds) and low risk (5/1 odds) (see Figure 2.6), with each risk level associated with a different size of landing area. The number of points participants could potentially win was dependent on the odds they had selected; betting odds represent the probability of an event to happen and therefore enables participants to figure out how many points they would win if their bet is correct. As an example, with odds of 5/1 (low risk in the current game), for every 1 point that is bet, 5 points could be won; there is a 20% chance of this happening, calculated by (1 / 5) x 100. In addition to the winnings, the wager is also returned to the participant, therefore, for every 1 point that is bet on 5/1 odds, a total of 6 points would be returned if the

bet wins (5 points for the win + 1 point wager returned).

Figure 2.5

A cannon (left image) fires a ball (red and yellow ball shown on the right image) that could land anywhere between 0 and 100 meters from the canon (11.25 meters in this example)

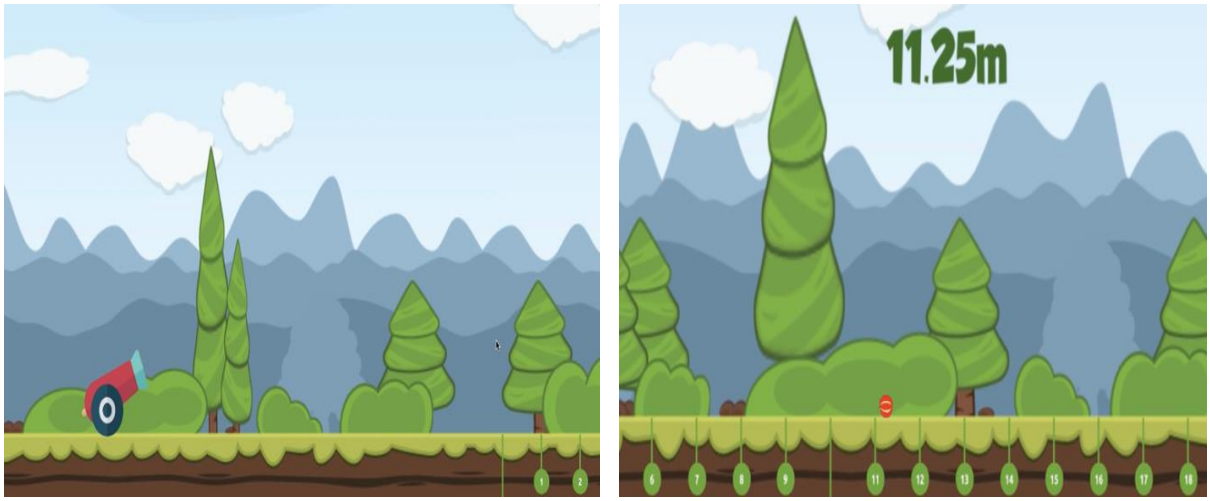
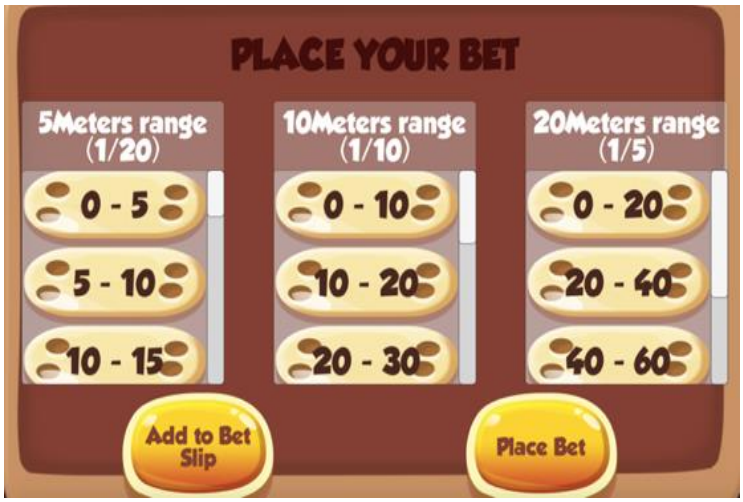


Figure 2.6

Risk decreasing from left (high risk) to right (low risk)



The current risk game consisted of ten experimental rounds, which comprised of five loss rounds (rounds 1, 2, 6, 8 and 9) and five win rounds (rounds 3, 4, 5, 7 and 10), thus participants experienced the same number of losses as wins. Unaware that the game is rigged,

participants were asked to place one bet in each round; each bet that they placed deducted ten points from their balance (they were credited 100 points at the beginning of the game). Participants were told that the ball fired from the cannon could land anywhere between 0 to 100 meters, and that they had three options to choose from for their bet (high, medium and low risk).

As shown in Figure 2.6, the high risk option (first dropdown from the left) allowed participants to select between a 5-meter range (20/1 odds), that is, whether the ball will land between 0-5 meters, 5-10 meters… or 95-100 meters; 210 points would be won if the correct 5-meter range was selected. The medium risk option (middle/second dropdown on Figure 2.6) allowed participants to select where they think the ball will land within a 10-meter range (10/1 odds), that is, participants could select whether the ball would land between 0-10 meters, 10-20 meters… or 90-100 meters; if participants guessed the correct 10-meter range, they would win 110 points. The low-risk option (the final/third dropdown from the left) allowed participants to select where they think the ball will land within a 20-meter range (5/1 odds), that is, participants could select whether the ball would land between 0-20 meters, 20-40 meters… or 80-100 meters; if participants guessed the correct range within the 20-meter range; they would win 60 points.

In summary, participants were asked to (1) select one range from any of the three dropdowns, (e.g. the lowest risk option: 20-meter range), (2) add their selected range to the bet slip (e.g. 20-40 meters), and (3) place their bet. Once the bet is placed, the cannon will fire the ball and participants will receive feedback (where the ball lands); this is repeated nine more times, making it a total of ten rounds. The dropdown participants select their bet from defined their potential returns (210 points, 110 points or 60 points – higher potential returns indicate riskier bets); the sum of participants' potential returns throughout the ten experimental rounds were

used as an assessment of risk-taking (higher figures indicate greater risk-taking).

Task-Comprehension Questionnaire

Participants were given a four-item questionnaire that tested their understanding of the game (see Appendix B). Question one asked participants "how many points could you potentially win if you bet 10 points on 10/1 odds?": 10 points, 100 points or 110 points. Question two asked participants "when placing a bet, selecting which of the following odds will lead to a better chance of winning?": 20/1 odds, 10/1 odds or 5/1 odds. Feedback was then provided to participants; if any of their answers were incorrect, they were given a further detailed explanation. Finally, participants were asked two similar questions: "how many points could you potentially win if you bet 10 points on 5/1 odds?" (10/50/60 points) and "when placing a bet, selecting which of the following odds is the riskiest option (higher chance of losing)?": 20/1 odds, 10/1 odds or 5/1 odds. Participants who answered questions three and four incorrectly were excluded from analyses.

Procedure

The procedure in Experiment 2 was the same as in Experiment 1 except for five changes: first, a novel risk game was used to assess risk-taking. Second, due to the different point structure on the novel game, monetary incentives were calculated as £1 for every 200 points gained, though as in Experiment 1, payment was dependent on the rolling of a die. Third, physiological arousal was only assessed during the mood-inducing video clip (prior to gambling) as results from Experiment 1 indicated that physiological arousal prior to gambling is highly correlated with physiological arousal during gambling. Fourth, prior to watching the mood-inducing video clip, participants were told that they would play a gambling-like game (risk game); due to the complexity of the game, participants were given a

detailed explanation of the game and had the opportunity to play a trial run. Finally, the explanation and trial run were followed up with the task-comprehension questionnaire.

Data Analyses

As in Experiment 1, a three-stage hierarchical regression model was used; the same independent variables were entered into the model (at the same stages). The outcome variable in Experiment 2 was the sum of potential returns across the ten experimental trials (greater figures indicate greater risk-taking); the rejection level was again set at $p = .05$.

2.3.2 Results

Manipulation check

A one-way ANOVA indicated that there was no difference in mood for the two groups (negative and positive) before watching the mood-inducing video clips, $t\ (74) = 0.11$, $p = .915$. To ensure that the experimental manipulations were effective in inducing different mood states, a mixed-design ANOVA was used to analyse participants' mood (derived from the SAM) before and after watching the mood-inducing video clips. As predicted, mood before the video clip was significantly different to mood after the video clip, $F\ (1, 74) = 47.10$, $p = .001$, $\eta p^2 = .39$ (see Table 2.5 for descriptive statistics). Similarly, results from the between subjects' effects indicate that mood after the manipulations was significantly different across the two conditions, $F\ (1, 74) = 62.34$, $p = .001$, $\eta p^2 = .46$. Finally, a significant interaction indicates that experimental manipulations had the desired effect, $F\ (1, 74) = 105.97$, $p = .001$, $\eta p^2 = .59$.

Table 2.5

Mean (M) and Standard Deviation (SD) of Mood Before and After Manipulation

	Before Video Clip		After Video Clip	
	M	*SD*	*M*	*SD*
Negative Mood Induction	6.61	1.00	3.97	1.22
Positive Mood Induction	6.58	1.13	7.11	0.98

Risk-Taking

A three-stage hierarchical regression was conducted with the sum of potential returns across the ten trials as the outcome variable. Identical to the three stage hierarchical regressions in Experiment 1, the covariate variables gender, greed, problem gambling (PGSI) and impulsivity were entered at stage one of the model. The predictor variables physiological arousal and condition (negative vs. positive affective state) were entered at stage two of the model and one interaction variable (condition X physiological arousal) was computed and entered at stage three; the regression statistics can be found in Table 2.6 (see Figure 2.7).

Table 2.6

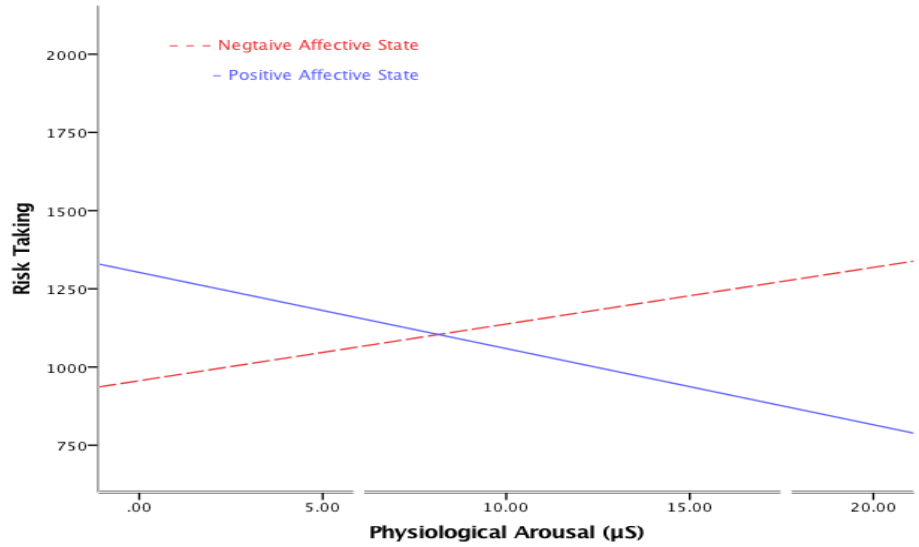
Summary of Hierarchical Regression Analysis for Variables Predicting Risk-Taking

Variable	β	*t*	*SE*	*R*	R^2	ΔR^2	*F*	ΔF	ΔF *p*	*p*
Model 1 *				**.40**	**.16**	**.16**	**3.34**	**3.34**	**.015**	**.015**
Gender	-0.10	-0.81	86.95							.422
Greed *	0.26	2.08	8.30							.042
PGSI *	-0.32	-2.66	56.50							.010
Impulsivity	0.12	1.04	1.67							.302
Model 2 *				**.41**	**.17**	**.01**	**2.37**	**0.51**	**.604**	**.039**
Gender	-0.12	-0.98	89.20							.332
Greed	0.26	1.94	8.97							.057
PGSI *	-0.32	-2.50	59.60							.015
Impulsivity	0.11	0.94	1.73							.349
Arousal	0.08	0.66	10.02							.514
Condition	0.09	0.78	66.01							.439
Model 3 **				**.50**	**.25**	**.08**	**3.28**	**7.43**	**.008**	**.005**
Gender	-0.14	-1.18	85.47							.241
Greed *	0.34	2.56	8.78							.013
PGSI **	-0.35	-2.81	57.17							.006
Impulsivity	0.05	0.44	1.68							.659
Arousal *	0.38	2.40	13.44							.019
Condition	0.07	0.66	63.23							.513
Condition X Arousal**	-0.41	-2.73	18.46							.008

*Note. Arousal refers to the average physiological arousal (μS) of participants throughout the video clip (prior to playing the risk game); N = 76; * p < .05; ** p < .01*

Figure 2.7

Effect of Arousal on Risk-Taking Under Negative and Positive Affective States



2.3.3 Discussion

Consistent with Experiment 1, it was hypothesized that the effect of physiological arousal on gambling intensity (risk-taking in this case) will differ under opposite affective states. As in Experiment 1, it was predicted that during negative mood states, as arousal levels increase, so would gambling intensity, whereas, during positive mood states, as arousal levels increase, gambling intensity would decrease. Consistent with predictions, a significant interaction effect was found in Experiment 2, that is, under negative affective states, higher arousal levels increased risk-taking, whereas, under positive affective states, higher arousal levels reduced risk-taking (see Figure 2.7). Results from Experiment 2 support earlier speculation that an interplay between arousal and valence failed to predict risk-taking in Experiment 1 because pleasant experiences during the CCT (i.e., incurring very few losses) may have encouraged participants to underweight the probability of losing, and thus take greater risks irrespective of their core affect (arousal x valence).

2.4 General Discussion

Studies examining the role of mood and arousal on gambling behaviour have produced mixed results. It was hypothesised that such inconsistencies in the literature may be due to arousal and mood having a combined effect on gambling intensity, consistent with theories of affect that indicate judgments and decisions are dependent on both the valence (i.e., negative or positive mood) and arousal (i.e., intensity) elements of affect (see Di Muro & Murray, 2012; Kim et al., 2010; Raghunathan et al., 2006; Russell & Barrett, 1999). Thus, both valence and arousal play an important role in judgments and decisions people make. Applied to gambling behaviour, the valence dimension reflects one's motive for gambling; for instance, under negative mood states, individuals gamble to avoid/escape aversive states (e.g., Cooper et al., 2000), while under positive mood states, individuals gamble to enhance positive affect (e.g., Goldstein et al., 2014). On the other hand, the arousal dimension reflects the intensity/severity of emotion (see Kuppens et al., 2013), thus as the intensity of emotion changes (via increases/reductions in arousal), the eagerness to avoid/escape aversive states or enhance positive affect is also likely to change. For example, under negative mood, as the severity of negative affect increases (i.e., via increases in arousal), so should the desire to avoid/escape aversive states, which is why, under negative mood states, one expects increases in arousal to increase gambling intensity. Whereas, under positive mood, as individuals move closer to elated mood states (via increases in arousal), the desire to gamble will reduce (i.e., individuals experiencing the least positive affect are more eager to enhance their mood), which is why an inverse correlation between arousal and gambling intensity under positive mood states is expected.

Consistent with the hypotheses, in Experiment 1, it was found that increases in physiological arousal reduced gambling speed during positive mood states, and increased gambling speed

during negative mood states. Experiment 1 also investigated this effect on risk-taking (also a sub-category of gambling intensity); although results followed the same pattern, the regression model failed to reach significance. As speculated, one possible reason for a lack of significance was that experiencing more wins than losses during the CCT could have encouraged participants to take greater risks by underweighting the probability of losing (see Hertwig et al., 2004). As such, Experiment 2 examined risk-taking using a novel risk game that ensured participants experienced as many losses as wins. Results from Experiment 2 demonstrate that increases in arousal increase risk-taking under negative mood states and decrease risk-taking under positive mood states, thus supporting the hypotheses. These results support the view that arousal and valence in interaction predict gambling intensity.

These findings not only provide an explanation for the mixed results in the literature but also support models and theories of PG that argue there are two primary subtypes of gamblers, those who gamble to avoid/escape aversive states and those who gamble to enhance positive affect (e.g., Blaszczynski & Nower, 2002; Lesieur, 2001; McCormick, 1988). More specifically, these findings demonstrate that as severity of negative affect increase (via increases in physiological arousal), so does gambling intensity, consonant with empirical studies that reveal negative emotions encourage gambling, as gambling allows individuals to cope with and/or temporarily avoid/escape aversive states (e.g., Wood & Griffiths, 2007). Thus, individuals under negative affect are gamblers otherwise referred to as 'emotionally vulnerable' (Blaszczynski & Nower, 2002), 'recurringly depressed' (McCormick, 1988), 'coping gamblers' (Stewart et al., 2008), 'escape-seekers' (Lesieur, 2001) and so on.

These results also demonstrate that as positive mood increase (via increases in arousal), gambling intensity decrease, consistent with findings that some individuals' motives for gambling derives from the need to enhance positive affect (i.e., seeking increases in

arousal/excitement to overcome boredom) (e.g., Goldstein et al., 2014). Therefore, individuals under positive affect are similar to gamblers often referred to as 'enhancement gamblers' (Stewart et al., 2008), 'behaviourally conditioned' (Blaszczynski & Nower, 2002), 'impulsive action seekers' (Lesieur, 2001), 'chronically understimulated' (McCormick, 1988), 'boredom prone' (Blaszczynski et al., 1990), and so forth. Findings that elated positive mood states reduce gambling intensity is also consistent with the MMH, which asserts that individuals under elated mood states are more risk-averse (i.e., cautious) as their desire is to maintain their positive affect and not risk jeopardising it via risky decisions (e.g., Isen & Patrick, 1983).

These findings indicate that arousal and mood in interaction provide a better framework for understanding changes in gambling intensity. These findings help explain the inconsistent findings in the literature that largely examine the role of mood and arousal on gambling behaviour in isolation. Moreover, these results are consistent with findings that there are two subtypes of problem gamblers, those who gamble to cope with and/or avoid/escape aversive states and those who gamble to enhance positive affect (e.g., Goldstein et al., 2014; Stewart et al., 2008). While this study did not examine problem gamblers, these findings could potentially relate to PG as research implies that greater risk-taking and gambling speeds (sub-categories of gambling intensity) lead to more losses over long-term play (see Rockloff & Dyer, 2007), in turn encouraging loss-chasing behaviour, a key indicator of PG (see Breen & Zuckerman, 1999; Lesieur, 1984; Rickwood et al., 2010).

To conclude, this Chapter not only provided an explanation for the inconsistencies found in the gambling literature but also delivered further evidence for the large body of research, as well as models and theories of PG, that assert there are two distinct subtypes of gamblers: those who gamble to enhance positive affect (i.e., seek excitement/increases in arousal) and

those who gamble to cope with and/or avoid/escape aversive states. This supports the development of specific targeted interventions which will be differentially effective across these subtypes.

3 Chapter 3: Hope as a Psychological Strength Among At-Risk Individuals

As discussed in previous Chapters, empirical research, as well as prominent models and theories of gambling, assert that there are two primary subtypes of gamblers: those who gamble to cope with and/or avoid/escape aversive states and those who gamble to enhance positive affect (e.g., Blaszczynski & Nower, 2002; Lesieur, 2001; McCormick, 1988; Stewart et al., 2008). In this Chapter, a look to the gambling literature reveals that escape-seekers (i.e., individuals who use gambling to avoid/escape aversive states) require more help than enhancement gamblers as they are more vulnerable; that is, escape-seekers are more likely to gamble problematically and face more severe gambling problems. Once the literature that indicates escape-seekers are particularly vulnerable was reviewed, hope as a psychological construct that can buffer against excessive gambling among this at-risk populations was introduced. Thus, in this Chapter, there was a shift from conclusions that there are two subtypes of gamblers, which supports the development of specific targeted interventions for each subtype, to the proposal of hope as a psychological construct that could protect those most at-risk from excessive gambling (i.e., populations resembling escape-seekers).

Research consistently indicates that both gambling to avoid/escape aversive states or to enhance positive affect can lead to PG (see Stewart et al., 2008). However, there is some evidence that escape-seekers have more overall gambling problems than enhancement gamblers (Goldstein et al., 2014). For instance, Stewart and colleagues' (2008) findings reveal that individuals with coping motives have more severe gambling problems than individuals with enhancement motives. Taken together, these findings indicate that "coping motives, and to a lesser extent enhancement motives, are associated with more problematic

forms of gambling" (Goldstein et al., 2014, *pp*. 218). Moreover, findings in the addiction literature also reveals that coping motives are associated with particularly problematic forms of addictive behaviour (e.g., Birch, Stewart & Zack, 2006; Cooper, Russell, Skinner & Windle, 1992), and lead to "greater overall addiction severity" (Stewart et al., 2008, *pp*. 266).

Escape-seekers may face greater gambling problems than enhancement gamblers because their problems and the accompanying aversive state is likely to be magnified after gambling. For instance, although individuals who gamble to cope with and/or escape aversive states notice an improvement in their mood while gambling, this pleasant change only lasts during a gambling session and is often followed by a magnified need state. Put differently, gambling is appealing for individuals struggling with aversive states as it allows individuals to feel rejuvenated and refreshed while gambling (i.e., they escape their negative reality), however, "problems that the gambler sought to forget are still there when he or she finishes gambling, in fact they are often magnified because more money has been lost or more responsibilities neglected" (McCormick, 1988, *pp*. 261). Unfortunately, the magnification of problems and aversive states lead to an increased need state, and as the need state increases, the gambler may see fewer options for allaying it, thus encouraging the individual to enter a vicious cycle of gambling to cope with and/or escape ongoing problems.

Unlike escape-seekers, enhancement gamblers are likely to satisfy their need state through gambling (i.e., enhance positive affect via increases in arousal/excitement), in turn reducing desires to continue gambling. In other words, irrespective of wins or losses, gambling is likely to provide a level of arousal/excitement that enhancement gamblers seek, thus satisfying need states and lessening desires to gamble. This subgroup of gamblers is similar to the 'behaviourally conditioned' gamblers in Blaszczynski and Nower's (2002) pathway

model of PG; Blaszczynski and Nower (2002) posit that the behaviourally conditioned gamblers gamble for excitement/physiological arousal, which can lead to PG through positive reinforcement. Though, it is highlighted that this subtype of gambler can be found "at the low end of the pathological dimension, they fluctuate between heavy and problem gambling, demonstrate motivation to enter treatment, comply with instructions and may successfully re-establish controlled levels of gambling post-treatment … Counselling and minimal intervention programmes benefit this subgroup" (Blaszczynski & Nower, 2002, *pp*. 492).

It is typically noted that escape-seekers face more severe gambling problems than enhancement gamblers. This is because for enhancement gamblers enhanced positive affect experienced via increases in excitement/physiological arousal can satisfy need states and in turn lessen desires to gamble, thus reducing the risk of developing severe gambling problems (see Blaszczynski & Nower, 2002; Goldstein et al., 2014; Stewart et al., 2008). Whereas, for individuals who gamble to cope with and/or escape aversive states (i.e., escape-seekers), problems that were avoided while gambling are likely to be magnified once individuals stop gambling, in turn encouraging individuals to gamble again as a means of allaying unpleasant states, an endless cycle that can lead to severe gambling problems (e.g., McCormick, 1988). It is suggested that the psychological dysfunction "makes this group more resistant to change" (Blaszczynski & Nower, 2002, *pp*. 494). To this end, the remainder of this Chapter will (1) review why escape-seekers fail to deal with their problems and the accompanying aversive state to an extent that they rely on gambling to disengage from their difficulties, and (2) propose how hope could potentially buffer against PG among escape-seekers.

Research findings indicates that escape-seekers use gambling when they have no (or little) other means of dealing with and/or overcoming their problems and aversive states. For

example, Callan and colleagues (2008) demonstrated that among individuals feeling a range of negative emotions as a result of financial hardship, gambling may be viewed as the only avenue to compensate for their problems and the resulting negative emotions. Callan and colleagues (2008) reported that individuals may use gambling to disengage from their problems and aversive states when they do not "perceive more conventional means of self-improvement as viable or feasible in the shorter term" (*pp*. 1515). In a more recent study, Callan, Shead and Olson (2011) argued that gambling "may be perceived by some people as an avenue – and perhaps the only avenue – to achieve the outcomes they feel they deserve in life" (*pp*. 956). In short, the authors of these studies claim that excessive gambling takes place when individuals feel that they have no other means (or have exhausted other means) of dealing with their problems and the accompanying negative emotions (see Callan et al., 2008; Callan et al., 2011).

The notion that escape-seekers use gambling when they feel that they have little to no other way of coping with and/or overcoming their problems and negative emotions is consistent with Nower and Blaszczynski's (2005) claim that pathway 2 gamblers (otherwise referred to as 'emotionally vulnerable gamblers') "display a lifelong inability to cope with stress in active ways. Instead, they will avoid stressors by mentally disengaging (gambling, watching television, playing video games) or physically disengaging (shopping, sleeping, partying) from stressors" (*pp*. 292). This line of thought suggests that problem gamblers rely on gambling to cope with/escape stressors and negative emotions as they display an inability to use positive coping strategies (i.e., problem or solution-focused strategies) that "allow the individual to consider multiple options when dealing with stressful or adverse life events" (Bergevin, Gupta, Derevensky & Kaufman, 2006, *pp*. 197). Put differently, the inability to consider multiple pathways to deal with problems and negative emotions encourages

disengagement behaviours such as gambling. Therefore, individuals' inability to use positive coping strategies and/or produce multiple alternative pathways to deal with their problems and aversive state can lead to excessive gambling.

There is much empirical evidence that excessive gambling is used as a coping strategy by individuals who are incapable of coping with and/or overcoming their problems and aversive state in more effective ways (e.g., Gupta & Derevensky, 2001; Marget, Gupta & Derevensky, 1999; Nower, Derevensky & Gupta, 2004). Unfortunately, using gambling as a coping strategy creates more problems to deal with (i.e., financial debt and relationship issues), which can encourage ongoing gambling; put different, Wood and Griffiths (2007) reported that individuals who increased gambling to avoid/escape responsibilities "were trapped in a cycle whereby gambling created problems, but at the same time, gambling created the solution by allowing them to dissociate and forget those problems" (*pp*. 116). Moreover, Wood & Griffiths' (2007) findings indicate that as problems increase, individuals "see no logical way out of their situation other than to continue gambling" (*pp*. 116). These findings are in line with the notion that individuals who gamble to cope with and/or escape their problems and resulting negative affect either have no alternate routes to overcome their difficulties or exhaust alternative options (e.g., Callan et al., 2011), which is consonant with Tani, Gori and Ponti's (2016) conclusion that problem gamblers "tend to believe that gambling is the only way to cope with stress" (*pp*. 61).

While escape-seekers may justify their behaviour with beliefs that there are little to no other means of coping with and/or overcoming their problems and resulting negative affect, it may be the case (at least for some individuals) that there are alternative options available but individuals' lack of 'willpower' (otherwise referred to as 'motivational strength') encourages

them to cope with and/or escape their problems by gambling. This is consonant with the notion that individuals with greater willpower are more able to resist addiction (see West, 1991). To elaborate, willpower is the "propensity to preserve with intentions in the face of adversity" (West, 1991, *pp*. 23), thus while individuals may know of several ways to deal with and/or overcome their problems, their willpower is likely to indicate whether they choose to resolve their problems via effective means or instead rely on maladaptive behaviours (i.e., gambling) to avoid/escape their problems and aversive states.

As previously discussed, escape-seekers gamble to cope with and/or escape problems and resulting negative affect, thus it makes sense that failures/inability to effectively cope with and overcome problems and aversive states is what triggers the need to gamble. Willpower is one factor that can determine whether individuals are able to effectively overcome their problems or not (Knapp & Delprato, 1980; Knapp & Karabenick, 1985; West, 1991), which suggests that individuals with little willpower are likely to rely on maladaptive behaviours (i.e., gambling) to disengage from the difficulties that they were unable to overcome. Put differently, if individuals lack the willpower to pursue their goals (i.e., to effectively overcome their problems), they may be tempted to engage in a range of maladaptive behaviours that afford them temporary disengagement from their difficulties and ensuing aversive state; this is consistent with Fishbach and Shen's (2014) findings that as motivational strength for pursuing goals increase (i.e., to overcome problems and negative affect), the motivation to embrace temptations reduce (i.e., to avoid/escape problems by gambling instead).

Fishbach and Shen's (2014) suggestion that enhanced willpower is key to pursuing goals without giving into temptations is consistent with earlier findings that willpower is

"extremely important in overcoming problems" (Knapp & Karabenick, 1985, *pp*. 351). Taken together, these findings suggest that among individuals who gamble to cope with and/or escape problems and negative affect (i.e., escape-seekers), enhanced willpower should prevent the development of PG. In support, Hodgins, Currie and el-Guebaly (2001) found that individuals who received a motivational enhancement telephone intervention reported greater reductions in gambling (over a 12-month follow-up period) than individuals who did not receive such motivational enhancement intervention, indicating that greater motivational strength can indeed prevent reliance on gambling. In short, a lack of willpower to overcome problems (and subsequent negative affect) via positive and effective means can lead individuals to give into temptations that afford temporary disengagement from problems and aversive state (i.e., excessive gambling).

In sum, there are two key reasons why some gamblers use gambling to cope with and/or escape their problems and aversive states: (i) the inability to produce multiple alternative and positive ways (i.e., more effective pathways) to deal with and overcome problems, thus relying on negative coping strategies, and (ii) the lack of willpower to use more positive and effective ways of overcoming problems when they are available. As such, any psychological construct(s) that can (a) encourage individuals to produce multiple pathways to achieve their goals (i.e., multiple pathways to overcome problems and resulting negative affect), and (b) enhance individuals' willpower so that they persist with goals in the face of adversity (i.e., continue to rely on positive and effective ways of overcoming problems irrespective of setbacks, failures and temptations) should protect escape-seekers from excessive gambling and the development of PG.

Hope – a psychological construct rooted in Positive Psychology – could determine whether individuals (1) are capable of producing multiple plausible pathways for goal attainment, and/or (2) possess the motivational strength to pursue goals in the face of adversity (Snyder, 1994). To elaborate, research findings indicate that in comparison to individuals low in hope, those high in hope produce more plausible routes to attain goals and possess greater willpower to move along those routes (see Snyder, 2002). As put forward by Roesch and colleagues (2010), "hope is conceptualised as an individual difference factor that colors one's appraisal of stressors" (*pp.* 192). Accordingly, the authors claim that "individuals high in hope should appraise stressors as more challenging (as opposed to more threatening), and thus have the ability and motivation to find solutions to ameliorate the stressful feelings and resolve the stressor" (Roesch et al., 2010, *pp*. 192-193).

While hope was first introduced in the scientific literature approximately six decades ago (see Menninger, 1959; Stotland, 1969), it was not until the mid-1970s and onwards that the construct gained popularity among the scientific community (Steed, 2002). Interest in hope as a psychological construct increased as a result of research related to stress and coping (Snyder, Irving & Anderson, 1991); more specifically, interest in hope and similar constructs gained popularity when scholars realised that such factors can facilitate coping and healthy outcomes (see Michael, 2000; Steed, 2002; Valle et al., 2006). In more recent decades, psychologists have attempted to conceptualise and assess hope in an effort to test the construct as a psychological strength (i.e., as a positive construct that can facilitate coping and beneficial outcomes: see Edwards & McClintock, 2013). Scholars consistently claim that hope is related to goal pursuit and attainment; in support, findings indicate that high-hope individuals are more likely to pursue and achieve their goals than low-hope individuals (e.g., Snyder, 1995; Stotland, 1969).

In examining the benefits of hope, empirical findings in the literature reveal that hope can act as a buffer against a range of maladaptive behaviours (e.g., Carvajal, Clair, Nash & Evans, 1998; Hagen, Myers & Mackintosh, 2005). For example, Carvajal and colleagues (1998) discovered that high-hope youths are more likely to avoid substance use than low-hopers. Similarly, Hagen and colleagues (2005) findings indicate that among at-risk children, those high in hope have fewer externalising and internalising behavioural problems. In a similar vein, Valle et al. (2006) found that in the face of stressful life events, adolescent youths with higher levels of hope are less likely to experience increased levels of internalising behaviours, which suggests that "a high level of hope reduces the adverse effects of stressful life events" (Valle et al., 2006, *pp*. 395). Taken together, these studies suggest that hope can protect youths from engaging in risky and maladaptive behaviours.

Similar findings are reported among adults, that is, studies have consistently found that higher levels of hope can reduce externalising and internalising behavioural problems among adults facing stressful life events (e.g., Horton & Wallander, 2001; Snyder, Lopez, Shorey, Rand & Feldman, 2003; Valle, Huebner & Suldo, 2004). Moreover, the benefits of hope among adults have been demonstrated in studies which have found higher levels of hope to be associated with increased self-esteem (Curry, Snyder, Cook, Ruby & Rehm, 1997), college grades (Chang, 1998), athletic performance (Curry, Maniar, Sondag & Sandstedt, 1999), and devotion to a healthy lifestyle (Harney, 1990). Overall, an overwhelming number of studies indicate that hope can serve as a psychological strength among both adults and youths. More specifically, it is reported that hope can be particularly important when facing adverse life events (see Chang, 1998; Fredrickson, 2009; Snyder, 2002; Valle et al., 2006).

In examining the benefits of hope, scholars have found a relationship between hope and coping efficacy and strategies (e.g., Danoff-Burg, Prelow & Swenson, 2004; Folkman, 2010). For example, Roesch and colleagues (2010) found that individuals "high in hope used a greater number of overall coping strategies in dealing with daily stressors" (*pp*. 7). Moreover, Roesch and colleagues (2010) found a positive relationship between hope and direct problem solving, planning and positive thinking, all of which can help individuals better cope with impediments. It is often reported that high-hope individuals' ability to exercise greater coping efficacy and use more problem-focused coping in the face of adversity protects them from engaging in risky and harmful behaviours (see Kashdan, Pelham, Lang, Hoza, Jacob, Jennings, et al., 2002; McClintock, 2015; Prelow, Danoff-Burg, Swenson & Pulgiano, 2004; Snyder, Rand & Sigmon, 2001; Wiles, Cott & Gibson, 2008). Therefore, hope can be especially important for individuals facing stressors regularly; in support, Chang (1998) examined the role of hope among college students facing academic stress and found that individuals high in hope employ problem-solving coping strategies while individuals low in hope rely on avoidant-coping strategies (i.e., potentially harmful disengagement behaviours). Chang's (1998) findings display the importance of hope during moments of stress and uncertainty, consistent with claims that hope appears in moments of difficulty to improve the future (Fredrickson, 2009; Snyder, 2002).

It is widely recognised that hope can serve as a psychological strength during moments of difficulty (see Fredrickson, 2009), which is particularly valuable as evidence indicates that hope is malleable and could be fostered (i.e., through intervention programs, counselling and education) (e.g., Cheavens, Feldman, Gum, Michael & Snyder, 2006; Herth, 2001; Klausner, Clarkin, Spielman, Pupo & Abrams, 1999; Lapierre, Dube, Bouffard & Alain, 2007; Rustoen & Hanestad, 1998; Snyder, 1995; Staats, 1991). Overall, hope can be nurtured in a number of

ways (see Green, Grant & Rynsaardt, 2007); as an example, studies have found that academic programs which combine psychological and life skills training enhance levels of hope (Curry & Maniar, 2003; da Costa Rolo & Gould, 2007). While majority of methods used to nurture hope involve guidance (e.g., academic program and counselling), there is also some suggestion that adequate rest and healthy nutritional intake can foster hope (see Snyder, 1995), which would be especially advantageous as modifying sleep and nutritional intake is not overwhelmingly difficult.

As highlighted above, many empirical studies have shown the benefits of hope, and in doing so, have acknowledged that high levels of hope can reduce both externalising and internalising behavioural problems (Chang, 1998; Valle et al., 2006). Furthermore, studies have shown that hope can be particularly valuable in moments of difficulty, with findings that individuals high in hope are less likely to engage in risky and harmful behaviours in response to adversities (Michael, 2000; Snyder, 2002). These findings suggest that hope may serve as a buffer against excessive and potentially problematic gambling among individuals who use gambling to cope with/escape adversities (i.e., coping gamblers/escape-seekers). Thus, in Chapter 4 the aim is to examine whether hope can protect at-risk populations (i.e., individuals facing negative emotions and/or life difficulties) from excessive and potentially problematic gambling.

The remainder of this thesis will use Snyder and colleagues' (1991) Adult Hope Scale to examine whether hope can protect at-risk individuals from excessive and potentially problematic gambling. As will be discussed below (prior to Chapter 4), The Adult Hope Scale will be used instead of other hope scales (or other cognitive-motivational constructs such as optimism) as empirical evidence indicates that the two factor scale is extensively

used in the literature, is superior to unidimensional models of hope, possesses good psychometric properties, and accounts for variance over and above other cognitive-motivational scales such as optimism and self-efficacy with regard to health-related and coping outcomes (Feldman, Rand & Kahle-Wrobleski, 2009; Lopez, Ciarlelli, Coffman, Stone & Wyatt, 2000; McClintock, 2015; Snyder et al., 1997). Moreover, there is much evidence that individuals high in hope are less likely to use avoidance/disengagement coping strategies when facing impediments, majorly because they can produce several plausible pathways to overcome impediments and/or remain determined to overcome impediments despite failures and setbacks. Finally, there is evidence that hope can be fostered, thus if findings indicate that hope can protect at-risk individuals from excessive and potentially problematic gambling, then intervention and prevention programs can include procedures that foster hope.

Although there are several unique theories and scales of hope, the most prominent and extensively researched is the Adult Hope Scale put forward by Snyder and colleagues (Snyder, Harris, Anderson, Holleran, Irving, Sigmon, Yoshinbu et al., 1991). Using Snyder and colleagues' (1991) hope scale, scholars have found the construct to be "associated with positive adjustment outcomes in both youth and adults" (McClintock, 2015, *pp*. 35). Therefore, in this thesis Snyder and colleagues' (1991) scale will be used to assess hope and examine whether the construct can protect at-risk individuals (i.e., individuals facing problems and regular stressors and thus motivated to disengage (via gambling) from their negative situation and ensuing aversive states) from increased gambling intensity and potentially PG. Prior to doing so, in the remainder of this Chapter will be a review of Snyder and colleagues' (1991) hope theory in more details.

Snyder et al. (1991) defined hope as a positive motivational state that consists of three interrelated components: (1) goals, (2) agency thinking, and (3) pathways thinking. To elaborate, goals are the basis of the theory while the two components (agency thinking and pathways thinking) determine the likelihood of pursuing and attaining goals (Snyder, 2000). To quote Snyder, "hope is defined as the process of thinking about one's goals, along with the motivation to move toward (agency) and the ways to achieve (pathways) these goals" (Snyder, 1995, *pp*. 355). Put differently, pathways thinking reflects individuals' ability to produce plausible routes to goals (Snyder, Rand & Sigmon, 2002) and is illustrated by internal speech such as 'I'll find a way to get this done' (Snyder et al., 1998); although such thinking only requires one route to a goal, "people with high hope often imagine multiple routes" (Valle et al., 2006, *pp*. 394). On the other hand, agency thinking is the "motivational component that ensures a person will be able to begin and sustain the effort necessary to follow a particular pathway" (Valle et al., 2006, *pp*. 395) and is illustrated by internal speech such as 'I am not going to be stopped' (Snyder et al., 1998). In short, in comparison to low-hope individuals, high-hope persons are more likely to attain their goals as they possess the ability to generate several plausible routes to their goals and persist (i.e., remain motivated) in the face of obstacles.

In hope theory, it is claimed that successful goal pursuit elicits positive emotions while failures to reach goals induce negative emotions and in turn encourage avoidance/disengagement coping behaviours (see Valle et al., 2006). This suggests that in the face of adversity (e.g., when facing problems and ensuing negative affect), while individuals' goal may be to effectively overcome their problems and aversive state, those low in hope may fail to (1) generate plausible routes (pathways), and/or (2) remain motivated (agency) to successfully attain such a goal; failures to attain goals will in turn induce more negative

emotions and encourage individuals to use avoidance/disengagement coping strategies (i.e., gamble to avoid/escape problems and resultant aversive states). In other words, high hopers' ability to generate several plausible routes to attain their goals and/or their determination to use those routes in the face of impediments is likely to protect them from engaging in avoidance/disengagement coping behaviours such as excessive gambling.

While the majority of empirical research into the effects of hope use Snyder and colleagues' (1991) scale, not many of these studies examine agency and pathways separately (see Chang, 2003; Feldman et al., 2009). Nonetheless, some studies have examined the effects of each component separately and found that agency thinking is particularly important in the pursuit of goals (e.g., Bailey, Eng, Frisch, & Snyder, 2007; Chang, 2003; Kashdan et al., 2002; Kwon & Hugelshofer, 2010). To shed light on why agency thinking may be the more influential component of hope, it is vital to recall what each component adds to the goal pursuit process. As previously stated, pathways thinking is an individual's ability "to generate paths toward desired goals" (McClintock, 2015, *pp*. 36), otherwise identified as an individual's 'waypower' (see Snyder, 2000; Snyder et al., 1991). This is the ability to generate a number of plausible paths to desired goals, thus if one path was to fail, individuals high in pathways thinking are able to move toward desired goals using a different plausible path. On the other hand, agency thinking is the "motivation to propel and maintain movement towards goals" (McClintock, 2015, *pp*. 37), otherwise referred to as an individual's 'willpower' (see Snyder, 2000; Snyder et al., 1991). Therefore, agency thinking "allows individuals to remain tenacious and exercise their pathways thinking to navigate around obstacles and stay focused on reaching their goals" (McClintock, 2015, *pp*. 37). This suggests that irrespective of whether individuals are able to generate several plausible pathways to pursue desired goals or not (pathways thinking), it is vital that individuals possess the

motivational strength/willpower to use those pathways and move towards desired goals, especially in the face of obstacles (agency thinking).

To summarise the above, when facing obstacles, individuals high in agency thinking remain motivated to continue towards their goal and try alternative pathways, whereas individuals low in agency thinking may lack the willpower to continue moving towards desired goals (see Chang, 2003; Feldman et al., 2009; Kwon & Hugelshofer, 2010). Thus, irrespective of whether individuals are able to generate multiple plausible pathways to desired goals, it is vital to possess a great level of willpower (agency thinking) to be able to attain those goals, which is consistent with Snyder's assertion that agency thinking "takes on special significance when people encounter impediments," given that "agency helps people to channel the requisite motivation to the best alternative pathway" (Snyder, 2002, *pp*. 251). Indeed, there is some empirical evidence that agency thinking plays a more influential role in reaching desired goals than pathways thinking; for instance, in Feldman and colleagues' (2009) study, agency thinking directly influenced goal attainment, but pathways thinking did not.

In support of the notion that agency thinking is the more influential component of hope, empirical studies have found that agency is better than pathways at predicting several outcomes related to goal attainment and coping with impediments (e.g., Bailey et al., 2007; Chang, 2003; Feldman et al., 2009; Irving, Snyder, Cheavens, Gravel, Hilberg & Nelson, 2004; Kashdan et al., 2002). While there is some evidence that agency thinking is the more influential component, it is important to realise that some individuals or populations "demonstrate the ability to maintain agency thoughts, but are unable to pinpoint particular pathways towards goals, or vice versa" (McClintock, 2015, *pp*. 37), which is why it is

important for empirical studies to examine the two components separately (Snyder, 1995), especially as the "two components are reciprocal, additive, and positively related but not synonymous" (Steed, 2002, *pp*. 470).

While there is some evidence that both components of hope are important and can effect outcomes separately (see Chang, 2003; Snyder, 1995; Steed, 2002), there remains some doubt on whether the hope scale should be used as a two factor or one-factor model (see Ahmed & Duhamel, 1994). Nonetheless, majority of research findings indicate that the two factor model is superior to the one-factor model; for example, Babyak, Snyder and Yoshinobu (1993) performed a structural factor analysis and found that the two factor (agency and pathways) model was superior to the one-factor model. Similarly, Valle, Huebner and Suldo's (2004) confirmatory factor analysis results "support the existence of two correlated, but distinct factors (i.e., pathways and agency)" (*pp*. 333). Furthermore, Valle and colleagues' (2004) results show that "when tested against a one-factor model, the two factor model yielded a significant improvement in model fit" (*pp*. 333). More recently, Roesch and Vaughn (2006) also found that the two factor model fit their data significantly better than a one-factor model; Roesch and Vaughn (2006) concluded that the hope scale is "better conceptualised as being composed of agency and pathways components and not as a unidimensional representation of general hope" (*pp*. 78). Taken together, empirical findings support Snyder and colleagues' (1991) model of hope which claims that the construct consists of two related but distinguishable components (agency and pathways).

As discussed, findings in the literature indicate that Snyder and colleagues' (1991) hope scale is a better predictor of outcome variables related to goal attainment and coping than other models of hope (see McClintock, 2015), and one reason for this is that unlike unidimensional

models of hope, Snyder and colleagues' (1991) hope scale consists of two correlated but not synonymous components that separately contribute to goal attainment and coping efficacy (Snyder et al., 1991). Indeed, the scale has been shown to load reliably on two factors across languages and diverse populations (e.g., English, French, Japanese and Portuguese) and exhibits (see Gana, Daigre & Ledrich, 2013; Kato & Snyder, 2005; Marques, Lopez, Fontaine, Coimbra & Mitchell, 2014; Snyder et al., 1991). Moreover, as previously stated, from all scales and theories of hope, Snyder and colleagues' (1991) two factor model is the most prominent and highly researched in the literature as the scale possesses good psychometric properties (see McClintock, 2015).

Snyder and colleagues (1997) examined the psychometric properties of the hope scale and found adequate internal consistency (demonstrated by Cronbach alphas ranging from .72 to .86). Moreover, the test-retest (over a one-month period) correlations for the children's version of the hope scale was positive and significant (ranging from .70 to .80). These psychometric properties are similar to those reported in the original Adult Hope Scale; in the original study, Cronbach alphas for the Adult Hope Scale ranged from .74 to .84 and the test-retest correlations were .85 over a 3-week period to .82 over a 10-week period (Snyder et al., 1991). Experimental construct validation was obtained by testing hope's application to daily life; for example, Snyder and colleagues (1991) found that high hopers view their goals in a more positive manner. Furthermore, concurrent construct validity was assessed by comparing Hope scale responses to responses obtained on other cognitive-motivational scales. For instance, empirical evidence indicates that scores on an optimism scale are correlated in the range of .5 to .6 with scores on Snyder and colleagues' hope scale (e.g., Lopez et al., 2000; Scheier & Carver, 1985).

Although hope is correlated with several other cognitive-motivational constructs rooted in Positive Psychology (i.e., optimism and self-efficacy), it is conceptually and statistically different (see Snyder, 2000; Snyder, Rand & Sigmon, 2002; Valle, Huebner & Suldo, 2004). Magaletta and Oliver (1999) examined whether hope and similar cognitive-motivational constructs (namely self-efficacy and optimism) predict overall well-being; their findings indicate that the three constructs are associated but not identical. Moreover, it was reported that "hope provides unique variance beyond optimism and self-efficacy in the prediction of well-being" (see McClintock, 2015, *pp*. 39). While it is often common knowledge that hope has similarities with other cognitive-motivational constructs such as self-efficacy, optimism and locus of control (Feldman et al., 2009; Tennen, Affleck & Tennen, 2002), empirical studies have consistently found that "hope accounts for variance over and above these variables with regard to pain tolerance, problem-focused coping, well-being, and mental health symptoms in college students, academic effort investment in children, and quality of life in substance-abusing homeless veterans" (see Feldman et al., 2009, *pp*. 481).

The distinctiveness of hope relative to other cognitive-motivational constructs has also been demonstrated in factor analytic studies that have found scores of hope load on different factors than scores of optimism and self-efficacy (see Bryant & Cvengros, 2004; Magaletta & Oliver, 1999). In short, while hope has some similarities with other cognitive-motivational constructs rooted in Positive Psychology, it is a unique construct that accounts for variance over and above similar constructs with regard to a range of health-related and coping outcomes (e.g., Irving, Seidner, Burling, Pagliarini, & Robbins-Sisco, 1998; Lackaye & Margalit, 2006; Magaletta & Oliver, 1999; Snyder, Berg, Woodward, Gum, Rand, Wrobleski et al., 2005; Snyder et al., 1991). Therefore, the remainder of this thesis will focus on whether

hope and predictors of hope can protect at-risk individuals from excessive and potentially problematic gambling.

4 Chapter 4: Relative Deprivation and Hope: Predictors of Risk Behaviour

4.1 Introduction

"Comparison is the thief of joy."

Theodore Roosevelt

As previously highlighted, studies indicate that individuals who gamble to escape negative emotions and events are at heightened risk of gambling problematically (see Goldstein et al., 2014; Stewart et al., 2008). For instance, there is evidence that relatively deprived individuals gamble excessively to cope with/escape negative emotions (e.g., resentment) stemming from Relative Deprivation (RD) (e.g., Callan et al., 2008). As will be discussed below, there is much evidence that the relatively deprived, in an attempt to cope with/escape negative feelings stemming from RD, engage in a range of maladaptive behaviours including excessive gambling (Callan et al., 2008). This supports the notion that the relatively deprived use gambling as a tool to cope with/escape aversive states, resembling escape-seekers. In support, Callan and colleagues (2011) reported that "because personal relative deprivation is an aversive state, people are often motivated to reduce it by engaging in various [risky] behaviours" (*pp*. 956). Therefore, in this Chapter the aim is to use the relatively deprived population, who are at heightened risk of gambling problematically to avoid/escape aversive states (resembling escape-seekers), to test whether hope can protect the vulnerable from excessive gambling. Consequently, across three experiments, this Chapter aims to examine whether hope moderates the relationship between RD and gambling intensity/severity. Prior to doing so, this Chapter will define RD, discuss the relationship between RD and

engagement in maladaptive behaviours, and highlight in what way hope may ameliorate the negative effects of RD.

The concept of RD has been widely adopted throughout the social sciences - from criminology (e.g., Lea & Young, 1993) and economics (e.g., Yitzhaki, 1979) to political science (Lichbach, 1990) and history (Snyder & Tilly, 1972) - to characterize the comparison between an individual and others. Operationally, RD is the belief that one is in a worse situation than similar others (i.e., neighbours), an observation that triggers negative emotions such as anger and resentment (see Crosby, 1976; Folger, 1987; Stiles, Liu & Kaplan, 2000), which in turn triggers achievement, escape and/or deviant behaviours (see Smith, Pettigrew, Pippin & Bialosiewicz, 2012 for a review). Thus, RD is a social psychological construct; "it postulates a subjective state that shapes emotions, cognitions and behaviour" (Pettigrew, 2016, *pp.* 9), and is a key concept invoked to explain a range of behaviours across the social sciences (Walker & Smith, 2002).

The feelings of anger and resentment stemming from RD encourage the relatively deprived to engage in behaviors that allay or overcome negative emotions (Smith et al., 2012). RD has been directly associated with a range of addictive behaviours, including alcohol consumption and excessive gambling (see Table 4.1). Yet it is also the case that not all relatively deprived individuals engage in maladaptive behaviours. That is, while some individuals rely on escape behaviours to temporarily alleviate negative emotions stemming from RD, others rely on achievement behaviours such as moonlighting to overcome RD and its affective correlates (Wilensky, 1963) (see Table 4.1). As previously suggested, one promising construct that may moderate the relationship between RD and maladaptive behaviours is the psychological construct of hope. As discussed in Chapter 3, hope is "a positive motivational state that is

based on an interactively derived sense of successful (a) agency (goal-directed energy), and (b) pathways (planning to meet goals)" (Snyder, Irving & Anderson, 1991, *pp*. 287). The pathway component of hope reflects the ability to produce plausible alternate routes when pursuing desired goals (Snyder, 2002). Agency-thinking represents the motivational component of hope theory, that is, the mental energy that is required to pursue goals (Snyder, 2002). Although agency-thinking is important in all aspects of goal pursuit, it is especially vital when encountering obstacles (Snyder, 1994; 2002).

Therefore, in the face of RD, it is predicted that high-hopers are likely to possess the motivational energy (agency-thinking) required to overcome RD. However, low-hopers' lack of agency-thinking to overcome RD is likely to encourage the use of avoidant-coping strategies (i.e., gambling) that temporarily allay negative feelings that they continue to face. There is much evidence that remaining hopeful in the face of adversity can be advantageous (see Snyder, 2002; Valle et al., 2006). For instance, when hopeful individuals face obstacles during goal pursuit, they show flexibility in their approach and find alternative pathways that they persist with (Snyder, 2002). In contrast, individuals low in hope ruminate about the hurdle (Michael, 2000) and "engage in almost magical escape fantasies" (Snyder, 2002, *pp*. 261). Put simply, when facing RD, low and high-hope individuals are both motivated to overcome RD (Smith et al., 2012), which could be accomplished by making positive adjustments, but not by engaging in deviant/escape behaviours that either worsen the situation or only allay negative feelings temporarily. Although both individuals, low and high in hope, are likely to view positive adjustments as a means of overcoming RD, it is only high-hope individuals who possess the ability to produce several plausible routes and persist in the face of obstacles. Thus, while high-hope individuals are likely to overcome RD via positive adjustments or at least persist through failures, low-hopers' inability to overcome RD is

likely to encourage engagement in a range of escape behaviours that temporarily allay negative emotions that they continue to face.

To put the above into context, imagine two relatively deprived individuals, Harry and Clive. Harry (a high-hope individual) and Clive (a low-hoper) both believe that participation in career development activities can lead to a better-paid job, which can help overcome RD and the accompanying negative emotions. Both Harry and Clive also know that gambling can temporarily alleviate the negative emotions stemming from RD but is unlikely to help in overcoming RD altogether; instead, losing money is likely to add to the problem. However, unlike Harry, Clive is unable to stay motivated in the face of obstacles, instead, Clive ruminates over obstacles and in an effort to forget about his problems, he gambles. Harry, not fazed by obstacles, decides to think of several methods in which he can achieve the same outcome, overcoming RD. Even during moments of desperation, Harry remains hopeful and motivated to continue along the path he knows is best. It is this difference in hope that indicates whether an individual is likely to succeed in overcoming adversities (i.e., RD and the accompanying negative emotions) or left to rely on escape behaviours to cope with the negative emotions they face.

In summary, although there is much evidence that the relatively deprived engage in various risky behaviours (i.e., gambling) to temporarily allay negative emotions stemming from RD (Callan et al., 2011; Haisley, Mostafa & Loewenstein, 2008; Smith et al., 2012; Wohl, Branscombe & Lister, 2014), no studies to date have examined whether hope can ameliorate the negative effects of RD and thus serve as a buffer against excessive and potentially problematic gambling among at-risk individuals. Thus, below it is explored for the first time whether hope moderates the relationship between RD and gambling intensity/severity among the relatively deprived, a population resembling escape-seekers.

Table 4.1

Relative Deprivation as a Predictor of Deviant, Escape and Achievement Behaviors

	Author & Year	Findings
Deviant Behaviors	Napoletano, Elgar, Saul, Dirks and Craig (2016)	RD is positively related to two types of bullying perpetration (relational & cyber)
	Stiles, Liu and Kaplan (2000)	RD induces negative feelings, which in turn motivate property crimes and violence
	Helgertz, Hess and Scott (2013)	As relative income increases, absence from work declines
	Odgers, Donley, Caspi, Bates and Moffitt (2015)	Children experiencing RD (i.e., those surrounded by more affluent neighbors) engage in more antisocial behaviors than their peers living in concentrated poverty
Escape Behaviors	Horne (2009)	RD is positively related to alcohol and marijuana use among juveniles
	Eibner and Evans (2005)	Higher RD is associated with a higher probability of smoking
	Callan, Ellard, Shead and Hodgins (2008)	RD is positively associated with desires to gamble
	Sim, Lim, Forde and Cheon (2018)	RD is positively associated with excess calorie intake
Achievement Behaviors	Turley (2002) and Zoogah (2010)	RD is associated with positive behaviors (e.g., relatively deprived are more self-reliant)
	Wilensky (1963)	Some relatively deprived attempt to improve by working a second job (moonlighting)
	Feldman and Turnley (2004)	RD is positively related to efforts to find alternative (potentially better) employment
	Olson, Roesesc, Meen and Robertson (1995)	RD is predictive of willingness to engage in self-improvement behaviors

4.2 Experiment 3

It is hypothesized that increases in hope would reduce risk-taking among relatively deprived individuals. To put these hypotheses to the test, Experiment 3 examined whether self-report assessment of hope and RD predict risk-taking in the laboratory (using the risk game from Experiment 2).

4.2.1 Methods

Participants

Fifty-five participants (45 females and 10 males; age range 18-22 years, M = 19.58, SD = 1.07) were recruited from the student population on a university campus via a volunteer participant credit system. A priori power analysis (using the G*Power 3.1 tool: Faul, Erdfelder, Buchner & Lang, 2009) indicated that for a regression model consisting of 7 predictor variables, 51 participants would be required to detect a large effect (R^2 = .25) with 80% power *(1-β err prob* = 0.8*).*

Materials

The Adult Hope Scale

Snyder et al.'s (1991) Adult Hope Scale was used to assess participants' level of hope; the scale has been shown to load reliably on two factors across languages and diverse populations (e.g., English, French, Japanese and Portuguese) and exhibits (see Gana, Daigre & Ledrich, 2013; Kato & Snyder, 2005; Marques et al., 2014; Snyder et al., 1991). The 12-item scale is divided into two subscales based on Snyder and colleagues' (1991) cognitive model of hope: (1) Agency (i.e., goal-directed energy) and (2) Pathways (i.e., number of alternate routes to desired goals). Four of the 12 items make up the agency subscale (e.g., *I*

energetically pursue my goals), four make up the pathway subscale (e.g., *I can think of many ways to get out of a jam*), while the remaining four were filler items (e.g., *I feel tired most of the time*). Participants were asked to rate each item on an 8-point scale (1 = definitely false – 8 = definitely true). Cronbach's α for this scale was 0.76.

Personal Relative Deprivation Scale (PRDS)

Callan, Shead and Olson's (2011) 5-item PRDS (α = .78) was designed to assess participants' general beliefs and feelings of their outcomes relative to similar others. Example items include: *I feel deprived when I think about what I have compared to what other people like me have* and *I feel privileged compared to other people like me*. Each item is rated on a 6-point scale (1 = strongly disagree – 6 = strongly agree). Cronbach's α for this scale was 0.79.

Risk Game

The task used to assess participants' risk-taking was identical to that used in Experiment 2 (see Figure 2.5).

Task-Comprehension Questionnaire

The task-comprehension questionnaire was identical to that used in Experiment 2. As in Experiment 2, participants who failed to answer the final two questions correctly were excluded from analysis.

Procedure

Participants first completed an online questionnaire, prior to attending a laboratory-based session one week later. The online questionnaire comprised demographic questions (age and gender), the Adult Hope scale and the PRDS. During the laboratory-based session, participants initially received a detailed explanation of the risk game and were given one trial

round to play, after which, they were asked to complete the task-comprehension questionnaire. Upon completion of the task-comprehension questionnaire, participants were asked to play the risk game for real monetary incentives calculated as £1 for every 200 points gained, though payment was dependent on the rolling of a die. That is, once participants were informed of their score on the risk game, they were asked to choose a number between one to six and roll a die; payment was made only if the die landed on participant's chosen number. Finally, participants were debriefed and thanked for their contribution.

Data Analyses

The outcome variable was calculated as the sum of *potential returns* across the ten experimental rounds (greater figures indicate greater risk-taking). A three-stage hierarchical regression model was used to examine whether the relation between RD and risk-taking was moderated by either the agency or pathway components of hope, when controlling for age and gender. The rejection level for all analyses was set at $p = .05$.

4.2.2 Results

Four participants failed the task-comprehension questionnaire and were thus excluded from analyses. The remaining fifty-one (43 females and 8 males) participants' data were used for analyses; participants' ages ranged from 18 - 22 years old ($M = 19.45$, $SD = 0.97$). A three-stage hierarchical regression was conducted with the sum of potential returns as the outcome variable (labelled *risk-taking* from this point on). The covariate variables age and gender were entered at stage one of the regression model as research has shown these to influence gambling behaviour (see Johansson et al., 2009). The predictor variables agency, pathway and RD were entered at stage two of the regression and two interaction variables (Agency x RD and Pathway x RD) were computed and entered at stage three. Significant results indicate

that the agency component of hope played a moderating role in the relation between RD and risk-taking (see Table 4.2 and Figure 4.1).

Table 4.2

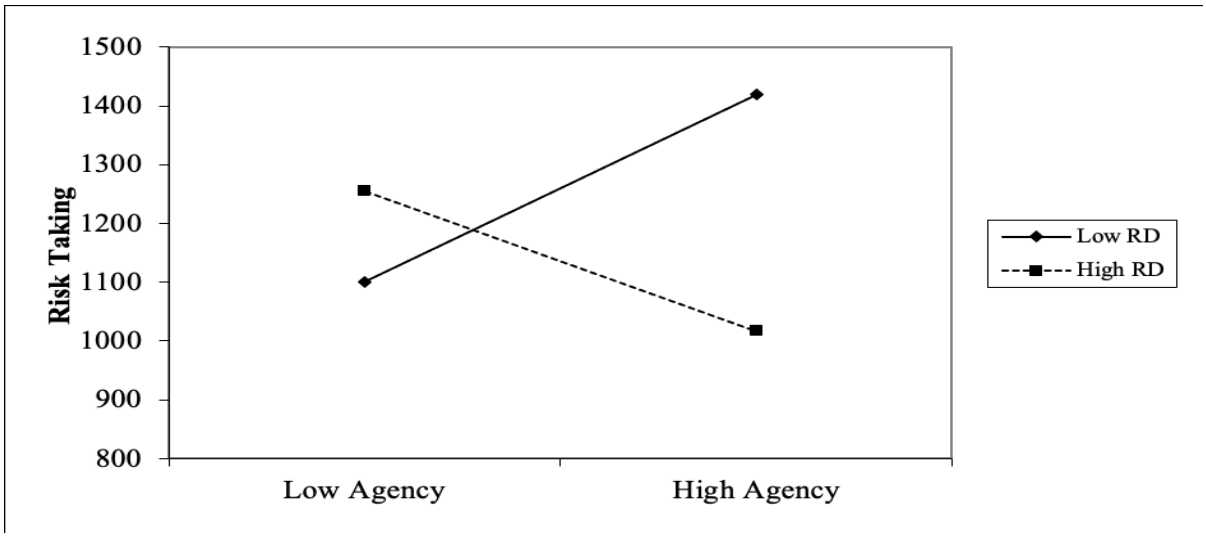
Summary of Hierarchical Regression Analysis for Variables Predicting Risk-Taking

Variable	*β*	*95% CI (LL, UL)*	*t*	*SE*	*R*	R^2	ΔR^2	*F*	*ΔF*	*ΔF p*	*p*
Model 1					**.34**	**.12**	**.12**	**3.15**	**3.15**	**.052**	**.052**
Age	0.30	(5.64, 169.78)	2.15	40.82							.037
Gender	0.12	(-123.40, 308.15)	0.86	107.32							.394
Model 2					**.37**	**.14**	**.02**	**1.40**	**0.33**	**.804**	**.241**
Age	0.32	(7.97, 178.59)	2.20	42.35							.033
Gender	0.14	(-113.59, 335.06)	0.99	111.38							.325
Agency	-0.01	(-23.92, 23.23)	-0.03	11.71							.977
Pathway	-0.15	(-30.44, 11.58)	-0.90	10.43							.371
RD	-0.04	(-26.59, 20.29)	-0.27	11.64							.788
Model 3 ***					**.61**	**.37**	**.24**	**3.60**	**8.00**	**.001**	**.004**
Age	0.39	(38.09, 189.33)	3.03	37.50							.004
Gender	0.11	(-111.81, 285.82)	0.88	98.59							.382
Agency	0.07	(-16.71, 26.38)	0.45	10.68							.653
Pathway	-0.27	(-37.08, 1.80)	-1.83	9.64							.074
RD	-0.22	(-37.97, 5.71)	-1.49	10.83							.144
Agency X RD	-0.51	(-14.26, -3.28)	-3.22	2.72							.002
Pathway X RD	-0.04	(-6.30, 4.76)	-0.28	2.74							.780

Note. $N = 51$; *** $p < .001$; *LL* and *UL* indicate the lower and upper limit of a Confidence Interval (for *B)*; A post hoc power analysis indicated that these results produced a power of 97.7%, (*1-β err prob* = 0.977) indicating that this study had an adequate sample size

Figure 4.1

The Effect of Agency-Thinking and RD (in Interaction) on Risk-Taking



Note. Points are plotted at +/- 1 SD of the mean.

4.2.3 Discussion

These results indicate that agency-thinking (i.e., goal-directed energy) is positively correlated with risk-taking when RD scores are low (i.e., when feeling relatively privileged) and negatively correlated with risk-taking when RD scores are high (i.e., when feeling relatively deprived). However, these results show that pathway-thinking (i.e., number of plausible alternate routes to desired goals) and RD, in interaction, do not predict changes in risk-taking. Therefore Experiment 3 provides correlational evidence in support of the hypotheses, but it does not determine whether feelings of relative deprivation *cause* changes in risk-taking among low and high-hope individuals.

4.3 Experiment 4

To test the causal effect of relative deprivation on risk-taking moderated by hope this study employed an experimental manipulation to induce feelings of relative deprivation and privilege. This experimental manipulation was a modified version of that validated by Callan

et al., (2008). In short, the aim of this study was to test whether feeling relatively deprived – elicited by the knowledge that one has *less* discretionary income than similar others – causes greater risk-taking among low-hope persons and decreased risk-taking among high-hope persons. As in Experiment 3, age and gender were added as covariates, but additionally Experiment 4 also included family income as a covariate (used as evaluation of Socioeconomic Status (SES)). Family income was added as a covariate as participants' Socioeconomic Status (SES) (family income is one variable of SES) may impact whether the experimental manipulations had the desired effect or not (i.e., individuals with high family income may not believe the cover story used to induce feelings of relative deprivation).

4.3.1 Methods

Participants

Fifty-one participants (41 females and 10 males) were initially recruited from the student population on a university campus. All 51 students were Psychology students recruited via a volunteer participant credit system; participants' age ranged from 18 – 39 years old (M = 20.31, SD = 3.28). While a priori power analysis using the G*Power 3.1 tool (Faul et al., 2009) indicated that a regression model consisting of 8 predictor variables would require 54 participants to detect a large effect (R^2 = .25) with 80% power *(1-β err prob* = 0.8*)*, post hoc power analysis from Experiment 3 indicated that a sample size of 51 will produce a high statistical power.

Materials and Procedure

Participants first completed an online questionnaire before attending a laboratory-based session a week later. The online questionnaire comprised the Adult Hope scale (as in Experiment 3), as well as demographic and personal information questions (age, gender,

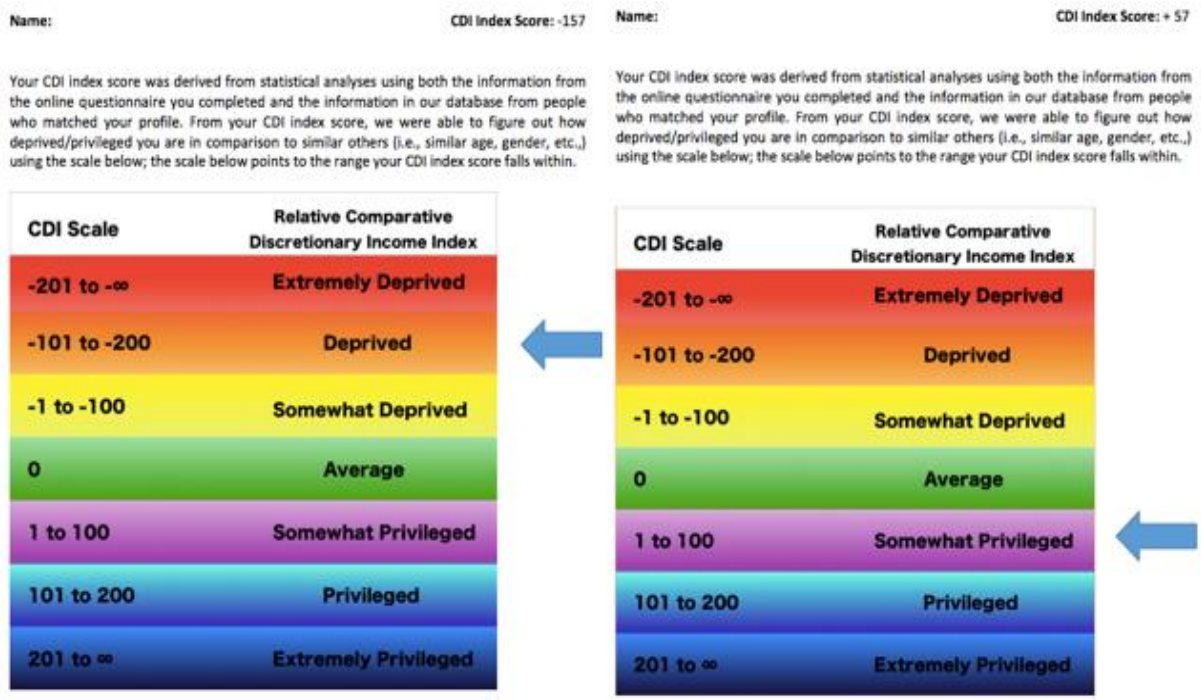
home postcode and family income). During the laboratory session, to deceive participants into believing that they are relatively deprived/privileged in comparison to similar others, and thus induce feelings of relative deprivation/privilege, a cover story that answers provided in the online questionnaire were used to calculate Comparative Discretionary Income (CDI) index scores was formulated. The following text was used to induce feelings of relative deprivation/privilege:

"Your Comparative Discretionary Income (CDI) index score was derived from statistical analyses using both the information from the online questionnaire you completed and the information in our database from people who matched your profile. From your CDI index score, we were able to figure out how deprived/privileged you are in comparison to similar others (i.e., similar age, gender, etc.). The scale below points to the range your CDI index score falls within."

Once the text was read out to the participant, they were informed of their CDI Index Score and where on a scale of extremely deprived to extremely privileged, their score was located (participants were unaware that this scale was invented for this experiment and thus not a true scale); the page containing this information was then handed to the participants for review (see Figure 4.2) (alternatively, see Appendix C for larger images).

Figure 4.2

Experimental Manipulations: Inducing Feelings of Relative Deprivation/Privilege



Once participants had reviewed the above page (Figure 4.2), the procedure was the same as in Experiment 3.

Data Analyses

As in Experiment 3, a three-stage hierarchical regression model was used to analyze results; the outcome variable remained the same (*potential returns* across ten experimental rounds, labelled as *risk-taking*). In addition to age and gender, family income was also entered at stage one of the regression model. Agency-thinking, pathway-thinking and condition (categorical variable: relatively deprived vs. relatively privileged) were entered at stage two of the model. Finally, two interaction variables (Agency X Condition and Pathway X Condition) were computed and entered at stage three of the regression model. The rejection level for all analyses was set at $p = .05$.

4.3.2 Results

One participant failed the task-comprehension questionnaire and was excluded from analyses. The remaining fifty (40 females and 10 males) participants' data were used for analyses; participants' age ranged from 18 - 39 years old (M = 20.34, SD = 3.31). A three-stage hierarchical regression was conducted to test whether feelings of relative deprivation/privilege caused changes in risk-taking among low and high-hope individuals (see Table 4.3 for regression statistics). The results indicated that among relatively privileged persons, as agency-thinking increases, so does risk-taking, whereas, among the relatively deprived, as agency-thinking increases, risk-taking reduces (see Figure 4.3).

Table 4.3

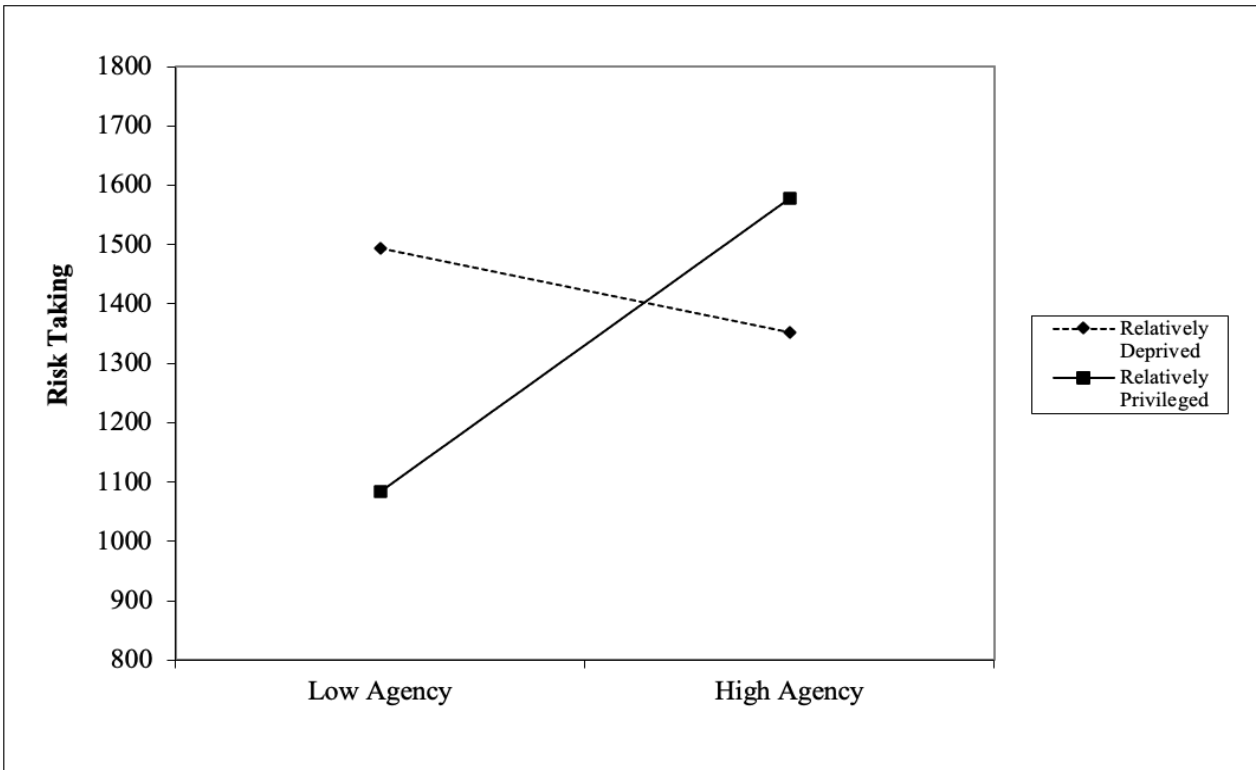
Summary of Hierarchical Regression Analysis for Variables Predicting Risk-Taking

Variable	*β*	*95% CI (LL, UL)*	*t*	*SE*	*R*	R^2	ΔR^2	*F*	*ΔF*	*ΔF p*	*p*
Model 1					**.24**	**.06**	**.06**	**0.96**	**0.96**	**.419**	**.419**
Age	0.04	(-19.57, 25.93)	0.28	11.30							.780
Gender	-0.18	(-304.01, 68.17)	-1.28	92.45							.209
Family Income	-0.18	(-30.47, 7.42)	-1.22	9.41							.227
Model 2					**.25**	**.06**	**.00**	**0.47**	**0.03**	**.993**	**.830**
Age	0.05	(-20.96, 28.97)	0.32	12.38							.748
Gender	-0.19	(-319.45, 74.57)	-1.25	97.69							.217
Family Income	-0.19	(-33.76, 8.92)	-1.17	10.58							.247
Agency	0.06	(-26.18, 33.33)	0.24	14.75							.810
Pathway	-0.01	(-27.16, 26.24)	-0.04	13.24							.972
Condition	-0.02	(-199.47, 183.53)	-0.08	94.96							.933
Model 3 *					**.56**	**.32**	**.26**	**2.39**	**7.72**	**.001**	**.033**
Age	0.02	(-20.35, 24.16)	0.17	11.02							.863
Gender	-0.22	(-311.30, 35.04)	-1.61	85.75							.115
Family Income	-0.41	(-47.07, -6.39)	-2.65	10.07							.011
Agency	-0.24	(-43.99, 14.91)	-1.00	14.58							.325
Pathway	-0.09	(-31.93, 20.48)	-0.44	12.98							.661
Condition	-0.18	(-267.56, 84.55)	-1.05	87.18							.300
Agency X Condition	0.63	(11.19, 134.94)	2.39	30.64							.022
Pathway X Condition	0.18	(-36.56, 80.83)	0.76	29.06							.451

Note. $N = 50$; * $p < .05$; *LL* and *UL* indicate the lower and upper limit of a Confidence Interval (for *B)*; A post hoc power analysis indicated that the results produced a power of 90.9%, (*1-β err prob* = 0.909) indicating that this study had an adequate sample size

Figure 4.3

The Effect of Relative Deprivation/Privilege (Experimentally Induced) and Agency-Thinking (in Interaction) on Risk-Taking



Note. Points are plotted at +/- 1 SD of the mean.

4.3.3 Discussion

In Experiment 4, the same pattern of results was found as in Experiment 3, though by experimentally inducing feelings of relative deprivation/privilege, these results confirm that feelings of relative deprivation *cause* greater risk-taking among individuals with low agency, while higher agency ameliorates the damaging effect of RD. Therefore, across Experiments 3 and 4, it was shown that an interplay between hope and RD predict changes in risk-taking. More specifically, findings indicate that hope (specifically, the agency component of hope) can buffer against risk-taking among the relatively deprived. Next, the aim was to examine whether a similar effect was found in a gambling population, thus testing whether these two constructs

together have the predicted effect on a real-world risk behaviour, problem gambling severity.

4.4 Study 1

There is some evidence that people rely on excessive gambling to compensate for feelings of resentment stemming from RD (e.g., Callan et al., 2008; Callan et al., 2011). Studies have also shown that PG often appears when individuals use gambling as a means of avoiding, coping with and/or escaping negative emotions (see Blaszczynski & Nower 2002; Goldstein et al., 2014; Stewart et al., 2008). However, findings from Experiments 3 and 4 provide some indication that hope can buffer against excessive gambling among individuals who view risk-taking (e.g., gambling) as a means of allaying negative feelings. Accordingly, it was predicted that among relatively deprived individuals, increases in hope will decrease gambling severity, as assessed by the PGSI. Therefore, while Experiments 3 and 4 examined risk-taking in the laboratory, Study 1 aims to examine real-world risk behavior (gambling severity among gamblers).

4.4.1 Methods

Participants

The aim was to have a sample of at least 51 participants necessary to uncover a large effect size (R^2 = .25) in a regression model which includes seven predictor variables, on the basis of an alpha of .05 and 80% power *(1-β err prob* = 0.8*)*. However, anticipating low response rates common with Web surveys which include some difficult questions (see Couper, 2000; Liu & Wronski, 2018), snowball sampling was used to recruit participants over 20 days, which led to 236 participants starting the survey (advertised on *Twitter*), of which a total of 122 participants (52%) completed the survey and were used for analyses. Participants consisted of 17 females and 105 males, whose age ranged from 18 to 60 years old (*M* =

28.80, *SD* = 9.25). All 122 participants who completed the online questionnaire had gambled at least once in the past 12 months.

Materials and Procedure

A survey created on *Qualtrics* was advertised online (*Twitter*). The post included a link to the survey and an invitation letter that highlighted, to complete the questionnaire study, one must be 18 years of age or over and have gambled at least once in the past 12 months (see Appendix D); these two conditions were again specified on the consent form. On the online survey, participants were asked to provide demographic information (age and gender) and whether they had gambled at least once in the past 12 months. Participants were then asked to complete The Adult Hope scale, the PRDS (both identical to Experiment 3) and the PGSI (identical to that used in Experiments 1 and 2).

Data Analyses

As recommended, the outcome variable (PGSI) was converted to a categorical variable. The four categories included: non-problem (score of 0), low-level (scores of 1 or 2), moderate-level (scores between 3 and 7), or problem (scores of 8 or more) gambling (Ferris & Wynne, 2001). A three-stage hierarchical regression model was used to examine whether the relation between RD and gambling severity was moderated by either the *agency-thinking* or *pathway-thinking* components of hope, when controlling for age and gender.[1] The rejection level for all analyses was set at $p = .05$.

4.4.2 Results

A total of 122 participants' data were used for analyses: as identified by PGSI scores, 33 participants had no gambling problems (27%), 32 had low level of problems with few or no identified negative consequences (26%), 46 had moderate level of problems leading to some negative consequences (38%) while 11 participants were problem gamblers with negative consequences and a possible loss of control (9%). A three-stage hierarchical regression was conducted with categorized PGSI scores as the outcome variable.[1] The covariate variables age and gender were entered at stage one of the regression model. The predictor variables agency, pathways and RD were entered at stage two of the regression and two interaction variables (agency X RD and pathways X RD) were computed and entered at stage three. Significant results indicate that hope (agency component) plays a moderating role in the relation between RD and gambling severity (see Table 4.4 for regression statistics). Although categorized PGSI scores were used to run the regression analysis, absolute PGSI scores were used to visually demonstrate the relation between RD and gambling severity among low and high agency-thinking persons (see Figure 4.4).

Table 4.4

Summary of Hierarchical Regression Analysis for Variables Predicting Gambling Severity

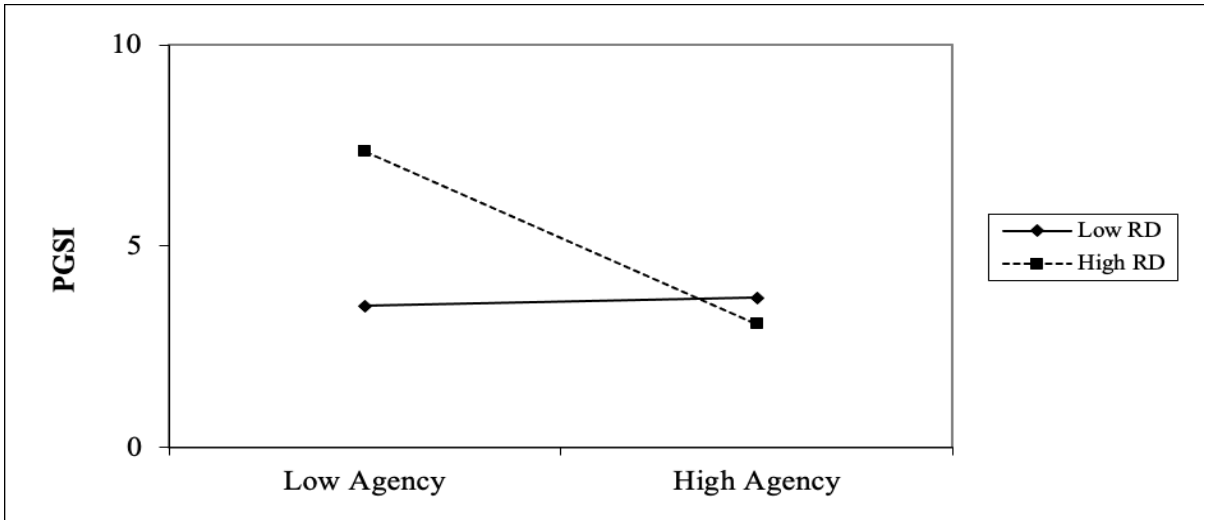
Variable	*β*	*95% CI (LL, UL)*	*t*	*SE*	*R*	R^2	ΔR^2	*F*	*ΔF*	*ΔF p*	*p*
Model 1					**.20**	**.04**	**.04**	**2.46**	**2.46**	**.090**	**.090**
Age	-0.11	(-0.03, 0.01)	-1.17	0.01							.245
Gender	-0.17	(-0.95, 0.04)	-1.83	0.25							.069
Model 2 ***					**.46**	**.21**	**.17**	**6.13**	**8.27**	**.001**	**.001**
Age	-0.06	(-0.02, 0.01)	-0.77	0.01							.445
Gender	-0.13	(-0.83, 0.11)	-1.51	0.24							.134
Agency	-0.28	(-0.10, -0.02)	-2.69	0.02							.008
Pathways	-0.07	(-0.07, 0.03)	-0.63	0.03							.528
RD	0.17	(-0.01, 0.08)	1.86	0.02							.065
Model 3 ***					**.49**	**.24**	**.04**	**5.27**	**2.68**	**.073**	**.001**
Age	-0.07	(-0.02, 0.01)	-0.82	0.01							.412
Gender	-0.12	(-0.79, 0.14)	-1.37	0.24							.173
Agency	-0.30	(-0.11, -0.02)	-2.92	0.02							.004
Pathways	-0.05	(-0.06, 0.04)	-0.47	0.03							.643
RD	0.15	(-0.01, 0.07)	1.70	0.02							.091
Agency X RD	-0.24	(-0.02, -0.01)	-2.32	0.01							.022
Pathways X RD	0.14	(-0.01, 0.02)	1.35	0.01							.178

Note. $N = 122$; * $p < .05$; ** $p < .01$; *** $p < .001$; *LL* and *UL* indicate the lower and upper limit of a Confidence Interval (for *B)*; A post hoc power analysis indicated that the results produced a power of 99.8%, (*1-β err prob* = 0.998) indicating that this study had an adequate sample size

[1] Although it is suggested that the PGSI scale – once converted into categories of non-problem, low-risk, moderate-risk, and problem gambling – should be treated as a continuous scale, it remains a concern that the scale shares more characteristics with an ordinal scale than a ratio scale. As such, an ordinal regression (all variables remained the same) and a multiple linear regression that included all the same predictor variables but substituted the outcome variable (from the typical categorical processing of the PGSI) to absolute PGSI scores were used. Results from both the ordinal regression [X^2 (7, $N = 122$) = 33.41, $p < .001$, *Nagelkerke* $R^2 = .26$] and the multiple linear regression with absolute PGSI entered as the outcome variable [F (7, 114) = 5.92, $p < .001$, $R^2 = .27$] reveal the same pattern of significant results (i.e., model and Agency X RD interaction term are significant).

Figure 4.4

The Effect of Agency-Thinking and RD (in Interaction) on PGSI



Note. Points are plotted at +/- 1 SD of the mean.

4.4.3 Discussion

Consistent with predictions, an inverse correlation between hope (agency component) and problem gambling severity existed among relatively deprived individuals, indicating that high agency-thinking individuals are less likely to gamble problematically in the face of RD. However, these results indicate that there is no significant relation between hope (either component) and gambling severity among relatively privileged persons. In sum, findings from this study support the notion that hope – specifically the agency component of hope – can act as a buffer against problem gambling among the relatively deprived, a population known to participate in a range of maladaptive behaviours to cope with feelings of resentment stemming from RD (see Smith et al., 2012).

4.5 General Discussion

While there is evidence that some RD individuals engage in maladaptive activities (i.e., gambling) to temporarily alleviate negative feelings stemming from RD (Callan et al., 2008),

not all RD individuals engage in such escape behaviours (Zoogah, 2010). This Chapter posited that hope – a unique form of positivity that appears during negative circumstances to help improve the future – would predict whether individuals engage in maladaptive behaviours to cope with RD or not.

Consistent with predictions, in Experiment 3, an inverse correlation between agency-thinking (i.e., goal-directed energy) and risk-taking among the relatively deprived was found. Employing an experimental design, Experiment 4 demonstrated that feelings of relative deprivation *cause* greater risk-taking among low agency-thinking individuals, providing further confirmation that hope – specifically the agency component of hope – can buffer against excessive risk-taking among the relatively deprived. Building on Experiments 3 and 4, results from Study 1 showed that hope and RD have the predicted association on real-world risk behaviour (gambling behaviour). While Snyder and colleagues (1991) suggested that both components of hope are fundamental in goal pursuit, these results indicate that only agency-thinking impacts risk-taking. These findings are consistent with Snyder's (1994; 2002) view that agency-thinking is especially vital when encountering difficulties. Taking these findings into account, future research to examine whether factors that enrich agency-thinking are particularly useful in protecting at-risk individuals from engaging in other illicit behaviours are encouraged.

Although this Chapter's primary focus was to explore the impact of relative deprivation on risk behaviour, findings that relatively affluent individuals take greater risks when high in hope (as found in Experiments 3 and 4) requires further interpretation. Indeed, there is evidence that affluent individuals also engage in illicit behaviours (e.g., Racz, McMahon & Luthar, 2011), but one can speculate that unlike their relatively deprived counterparts, their desire to engage in maladaptive behaviours does not root from their need to allay negative

feelings. Instead, the relatively affluent engage in illicit behaviours for recreational purposes (see Sterk-Elifson, 1996). The relatively affluent share similarities with Blaszczynski and Nower's (2002) 'Pathway 1 gamblers' who "do not show signs of psychological disturbance but simply lose control over gambling in response to the effects of conditioning and distorted cognitions surrounding probability of winning" (*pp*. 496). Thus, characteristics of hope may cause the relatively affluent to appraise risks more positively (i.e., distorted cognitions surrounding the probability of winning), in turn encouraging these individuals to take greater risks. However, as the relatively affluent participate in maladaptive behaviours for recreational purposes, they are likely to stop when the fun stops, which would suggest that hope would not influence their real-world risk behaviour (as found in Study 1).

Findings across the two experiments and one study indicate that hope can protect the relatively deprived from engaging in risky behaviours, which makes the case for real-world hope interventions and thus merits further discussion. For example, while eliminating all negative life events and stressors may be impossible, individuals may benefit from attending programs that foster cognitive-motivational strengths such as hopeful thinking, which can in turn aid individuals to better cope with adversities and not engage in risky behaviours to escape from adversities and their accompanying negative emotions. That is, individuals facing adversities may benefit from attending programs that foster hope, such as the 'Making Hope Happen' program (Edwards & Lopez, 2000) that has been successfully used to enhance individuals' hope levels (Bouwkamp & Lopez, 2001; Pedrottio, 2000).

While attending structured programs to enhance hope levels is the norm, there is some suggestion that adequate sleep and healthy nutritional intake can also manufacture hope (Snyder, 1995), which would be particularly advantageous as altering these factors at individual level is not overwhelmingly difficult. However, being unaware of any papers that

have examined the relationship between sleep and hope and only being aware of one study that has examined the relationship between nutritional intake and hope (Coleman, Berg & Thompson, 2014) indicates a gap in the literature which can be further explored. Therefore, the relationship between sleep quality, nutritional intake and hope will be studied via exploratory research (Chapter 5). Consequently, Chapter 5 will examine whether good sleep quality and nutritional habits are related to increased levels of hope and whether higher levels of hope in turn reduce gambling severity (as assessed by the PGSI) of at-risk individuals (i.e., individuals eager to disengage from problems and negative emotions).

5 Chapter 5: The Benefits of Healthy Nutritional Habits, Good-Quality Sleep and Hope

5.1 Introduction

In the previous Chapter, across two experiments and one study, it was found that high levels of hope can reduce gambling intensity and severity among the relatively deprived, a population who may otherwise rely on excessive and problematic gambling to cope with/escape negative emotions stemming from RD (Callan et al., 2008). These findings indicate that enhancing hope in escape-seekers (i.e., individuals who gamble to cope with/escape problems and negative emotions: see Blaszczynski & Nower, 2002; Lesieur, 2001; Stewart et al., 2008) can reduce the intensity and severity of gambling, which indicates that hope can make for positive prevention and intervention among individuals at heightened risk of PG. This is particularly valuable as hope can be fostered through structured programs and counselling (see Bouwkamp & Lopez, 2001; Edwards & Lopez, 2000; Pedrottio, 2000).

There is some suggestion that hope can also be fostered via good quality sleep and/or healthy nutritional habits (Snyder, 1995), though as will be discussed below, there is little-to-no empirical evidence for this relationship in the literature. Nonetheless, there is some indirect evidence that good quality sleep and healthy nutritional intakes may be associated with higher levels of hope (as will be discussed in section 5.2.3 below), which merits further exploration because (1) higher levels of hope can in turn protect at-risk individuals from PG (as evidenced in Chapter 4), and (2) modifying sleep quality and nutritional intake is not particularly difficult. Therefore, the first study of this Chapter aims to explore whether good quality sleep and/or nutritional habits are associated with higher levels of hope, and whether

higher levels of hope are related to reduced PG severity among residents of deprived neighbourhoods. Examining this relationship among residents of deprived neighbourhoods (as opposed to the relatively deprived) will indicate whether hope can make for positive prevention and intervention in a variety of at-risk populations resembling escape-seekers.

While it is advantageous to investigate whether hope and potential predictors of hope (i.e., nutritional intake and sleep quality) reduce PG severity among at-risk individuals, it is equally beneficial to examine whether hope can aid recovery processes if problems were to appear. This is particularly important as populations facing a great deal of problems and negative emotions (i.e., residents of deprived neighbourhoods) are likely to incur harmful consequences (i.e., addictions) by engaging in a range of risky behaviours to disengage from their problems and aversive states (see Algren, Ekholm, Nielsen, Ersbøll, Bak & Andersen, 2018). One way in which individuals can recover from harmful consequences is to seek help (Dawson, Grant, Stinson & Chou, 2006); indeed, there is evidence that seeking both formal (i.e., help from professional sources) and informal (i.e., help from friends and family) help could aid recovery (Booth, Russell, Soucek & Laughlin, 1992; Hogan, Linden & Najarian, 2002; Martin, 2002; Nuske & Hing, 2013). There is some suggestion, as will be discussed in section 5.3 below, that higher levels of hope could encourage help-seeking behaviours (e.g., Boddy, O'Leary, Tsui, Pak & Wang, 2018). Accordingly, in Study 3, the aim is to explore whether higher levels of hope among residents of deprived neighbourhoods are associated with increased intentions to seek professional and non-professional help, which will reveal whether hope can aid the recovery of at-risk individuals if problems were to emerge.

In sum, the purpose of this exploratory Chapter is to examine whether residents of deprived neighbourhoods' (a) sleep quality and nutritional habits are related to their level of hope and

whether their level of hope is in turn related to their PG severity (Study 2), and (b) hope levels are positively correlated with their intentions to seek help if problems were to emerge (Study 3).

5.2 Study 2

As highlighted above, residents of deprived neighbourhoods are another population likely to rely on a range of maladaptive behaviours (i.e., excessive gambling) to avoid/cope with problems and negative emotions stemming from adverse neighbourhood factors: see Auger, Lo, Cantinotti & O'Loughlin, 2010; Geel & Fisher, 2015; Slutske, Piasecki, Deutsch, Statham & Martin, 2019; Tu, Gray & Walton, 2014). Thus, in Study 2, the aim is to explore whether hope and potential predictors of hope (nutritional intake and sleep quality) can protect this at-risk population from increased PG severity. Prior to doing so, it is important to look to the literature to (1) define neighbourhood deprivation, identify how it is assessed and used in health-related research, (2) shed light on the relationship between neighbourhood deprivation and gambling, and (3) explore whether there is any evidence that good quality sleep and nutritional intake enrich hope and subsequently reduce PG severity, which would suggest that hope and predictors of hope may protect residents of deprived neighbourhoods against PG.

5.2.1 Neighbourhood Deprivation: Definition, Scale and Research

A neighbourhood is defined as the area surrounding the location of an individual's home. In the UK, postcode sectors are used to define neighbourhood boundaries; "postcode sectors have an average population of around 5000 and are administrative units created for the organisation of mail delivery" (Stafford, Cummins, Macintyre, Ellaway & Marmot, 2005, *pp*. 1685). Research indicates that certain characteristics of neighbourhoods define whether a

neighbourhood is deprived or not (see Piro, Naess & Claussen, 2007). Indeed, this is consistent with the argument that neighbourhood deprivation is a "multi-dimensional problem, encompassing a range of domains such as financial, health, education, services or crime" (Payne & Abel, 2012, *pp*. 4). These neighbourhood disadvantages have been associated with a range of risky decision-making and health problems (e.g., Wardle, Keily, Astbury & Reith, 2014). Anderson, Sorlie, Backlund, Johnson and Kaplan (1997) claim that neighbourhood deprivation "may summarise an area's potential for health risk from ecological concentration of poverty, unemployment, economic disinvestment, and social disorganisation" (*pp*. 42). The relationship between neighbourhood deprivation and health problems have encouraged scholars and governmental bodies to develop indices that assess neighbourhood deprivation (Niggebrugge, Haynes, Jones, Lovett & Harvey, 2005).

The UK has been at the forefront in the development of indices that assess neighbourhood deprivation with the Townsend Index (Townsend, 1979), Jarman Score (Jarman, 1983), Carstairs Index (Carstairs, 1995) and Breadline Britain Index (Gordon, 1995) being four of the most renowned first-generation indices (see Fairburn, Maier & Braubach, 2016). In 2000, the Index of Multiple Deprivation (IMD 2000: Noble, Penhale, Smith & Wright, 2000) was developed to overcome the deficiencies of first-generation indices. Updated versions of the IMD have been developed since then, with the most recent (at the time of writing) being the Index of Multiple Deprivation 2015 (IMD 2015: Smith, Noble, Noble, Wright, McLennan & Plunkett, 2015). As discussed above, neighbourhood deprivation is a multi-dimensional problem (Payne & Abel, 2012), and the IMD 2015 and its earlier versions combine information from several key domains to produce an overall value of neighbourhood deprivation, which makes the indices superior to the first-generation indices (Fairburn et al., 2016). For example, the IMD 2015 combines information from seven domains to produce an

overall value of neighbourhood deprivation: (1) income, (2) employment, (3) education, skills and training, (4) health and disability, (5) crime, (6) barriers to housing and services, and (7) living environment (Smith et al., 2015). The overall neighbourhood deprivation scores are ranked and divided into ten equal groups called deciles: decile 1 represents the most deprived 10% of neighbourhoods nationally and decile 10 reflects the least deprived 10% of neighbourhoods nationally (Smith et al., 2015).

The IMD has historically been used by government bodies, charities and health organisations to identify neighbourhoods in greater need of funding and intervention (Fairburn et al., 2016). Moreover, since the development of second-generation indices of multiple deprivation (i.e., IMD 2000, IMD 2010 and IMD 2015), there has been an increase in the use of such indices in research which has "directly fed into public policy, especially public policy that would have a direct impact on the determinants of health" (Fairburn et al., 2016, *pp*. 1). For example, Cummins, McKay and MacIntyre (2005) found a significantly greater number of McDonald restaurants in England and Scotland's most deprived neighbourhoods, which they suggest is one reason for the higher obesity levels reported in deprived neighbourhoods. The result of this and similar studies is what encourages "many local authorities to introduce a ban on new takeaway food outlets in many parts of the country" (Fairburn et al., 2016, *pp*. 9). Similarly, using a Deprivation Index, Pearce, Mason, Hiscock and Day (2008) found that there was an increased number of gambling venues in deprived neighbourhoods and the likelihood of being a problem gambler were greater in neighbourhoods with easier accessibility to gambling. Below is a review of the relationship between neighbourhood deprivation and gambling in more details.

5.2.2 Neighbourhood Deprivation and Gambling

Scholars have consistently found a relationship between neighbourhood deprivation and gambling problems (see Wardle et al., 2014; Wardle, Moody, Spence, Orford, Jotangia & Dobbie, 2011). For example, studies have found that PG in Australia (Livingstone, 2001) and New Zealand (Wheeler, Rigby & Huriwai, 2006) "is frequently clustered in areas of greater deprivation" (Carrà et al., 2017, *pp*. 460). In fact, research has found a relationship between neighbourhood deprivation and PG in many countries including the United States, Great Britain, New Zealand and Australia (see Barnes, Welte, Tidwell & Hoffman, 2013; Pearce et al., 2008; Slutske, Deutsch, Statham & Martin, 2015; Wardle et al., 2011; Welte, Wieczorek, Barnes, Tidwell & Hoffman, 2004). Moreover, empirical research indicates that the relationship between neighbourhood deprivation and PG remain even when controlling for various demographic, personality, family and gambling-accessibility factors (Welte, Barnes, Tidwell & Wieczorek, 2017). Taken together, these findings indicate that "disadvantaged neighbourhoods provide environments that are high in risk" (Slutske et al., 2019, *pp*. 592).

One explanation for the relationship between neighbourhood deprivation and PG is that disadvantaged neighbourhoods "function as a chronic stressor or persistent strain" (Slutske et al., 2019, *pp*. 591) (see also Boardman, 2004; Steptoe & Feldman, 2001) that in turn "encourage gambling as a means to cope with or escape problems" (Slutske et al., 2019, *pp*. 591) (see also Sinha, 2008; Stewart & Zack, 2008). Empirical studies have found that adverse life events and accompanying negative emotions are related to gambling problems among adolescents (Bergevin et al., 2006; Cheung, 2016) and adults (Eitle & Taylor, 2010; Ronzitti, Kraus, Hoff & Potenza, 2018), which is supportive of the notion that the hardships and negative emotions residents of deprived neighbourhoods face (i.e., poor housing and

overcrowding prompting anger: see Hastings, 2009) may encourage them to use gambling as a tool to cope with/escape their problems and aversive state.

As highlighted above, stress and negative emotions stemming from adverse neighbourhood factors "gets under the skin" (Prior, Manley & Jones, 2018, *pp*. 25) and in turn encourages externalising behaviours (Slutske et al., 2019). As an example, deprived neighbourhood characteristics such as poor housing, overcrowding and perceived danger can elicit a range of negative emotions such as anger (Hastings, 2009), which may in turn motivate engagement in maladaptive behaviours (i.e., excessive gambling) as a means to cope with/escape the negative emotions and the stressors causing them (Stewart & Zack, 2008). This is consistent with claims that "bad times may cause desperation, and the desperate may turn to lotteries in an effort to escape hardship" (Blalock, Just & Simon, 2007, *pp*. 545). As discussed throughout the current thesis, the desire to cope with/escape negative emotions and problems can lead to PG (e.g., Blaszczynski & Nower, 2002; Goldstein et al., 2014); while this is one reason for the increased number of problem gamblers in deprived neighbourhoods (Slutske et al., 2019), it does not help that gambling venues are more accessible in these neighbourhoods (e.g., National Gambling Impact & Policy Commission, 1999; Welte et al., 2004) because "availability and access to gambling facilities is associated with a higher incidence of pathological gambling" (Blaszczynski & Nower, 2002, *pp*. 491) (see also Abbott & Volberg 1996; Grun & McKeigue 2000; Volberg 1996).

In short, residents of deprived neighbourhoods may use gambling as a tool to cope with/escape neighbourhood stressors and resultant negative emotions (see Boardman, 2004; Slutske et al., 2019), which suggests that factors that improve coping efficacy (i.e., hope) are likely to reduce desires to gamble excessively/problematically.

5.2.3 The Relationship Between Sleep Quality, Nutritional Intake, Hope and Gambling

As discussed in previous Chapters, hope can improve coping efficacy and help individuals overcome problems, thus reducing the need to engage in maladaptive behaviours to cope with/escape adversities and negative emotions (Chang, 1998; Snyder, 2002; Valle et al., 2006). In support, findings from Chapter 4 indicate that higher levels of hope reduce gambling intensity and severity among the relatively deprived, a population known to use excessive gambling as a tool to cope with/escape negative emotions stemming from RD (Callan et al., 2008). Accordingly, the aim is to explore whether higher levels of hope are associated with reduced PG severity among residents of deprived neighbourhoods, another population facing adversities and thus likely to gamble problematically to disengage from problems and accompanying negative emotions (see Slutske et al., 2019). Moreover, as there is some suggestion that good quality sleep and nutritional habits can foster hope (Snyder, 1995), the current study will expand on testing the direct relationship between hope and PG severity by investigating whether good quality sleep and nutritional intake are related to higher levels of hope and whether higher levels of hope are in turn associated with reduced PG severity.

Empirical evidence indicates that hope is malleable and can be fostered (Cheavens et al., 2006; Herth, 2001; Klausner et al., 1999; Lapierre et al., 2007; Rustoen & Hanestad, 1998; Staats, 1991), thus, potential predictors of hope may reduce engagement in maladaptive behaviours through enhancing hope. Snyder (1995) suggests that adequate rest and healthy nutritional intake can foster hope, which would be particularly advantageous as making adjustments to these two are not overwhelmingly difficult. Despite Snyder's (1995) claims, there are no papers to date that have examined the relationship between sleep and hope,

though at least one study examined the relationship between nutritional habits and hope (Coleman, Berg & Thompson, 2014). Coleman and colleagues (2014) found individuals who ate five or more fruits and vegetables per day were significantly more hopeful than those who ate less than 5 fruits and vegetables per day.

While there is little research directly assessing the role of nutritional habits and sleep quality on hope, there is evidence that nutritional intake and sleep quality effect cognitive functions (Randazzo, Muehlbach, Schweitzer & Waish, 1998; Smith & Blumenthal, 2016) and energy levels (Alapin, Fichten, Libman, Creti, Bailes & Wright, 2000; Hart, 2016), which may in turn influence whether individuals possess the ability and drive to produce multiple plausible routes to attain goals (pathways thinking) and persist in moving along those routes (agency thinking). For example, one study found a negative association between fatigue and hope (Lee, 2017), indicating that individuals with little-to-no energy (fatigue) may not have the mental drive required to plan and achieve goals. Therefore, there is reason to believe that nutritional habits and sleep quality can impact individual components of hope, especially agency thinking, which is related to the motivational force required to attain goals (Snyder, 2002). This may be why some hope-based interventions include a session on increasing individuals' *physical willpower* by encouraging healthy eating and exercise habits (e.g., Shekarabi-Ahari, Younesi, Borjali & Ansari-Damavandi, 2012).

Further evidence – albeit indirect – that nutritional habits and sleep quality may foster hope comes from findings that the two are related to other cognitive-motivational constructs such as optimism and self-esteem. For example, nutritional intake (Hingle et al., 2014) and sleep quality (Lau, Hui, Lam & Cheung, 2017) are related to optimism. Similarly, healthy diets (Megel, Wade, Hawkins & Norton, 1994) and adequate sleep (Lemola et al., 2013) are also

correlated with self-esteem. Therefore, based on existing research that relates nutritional habits and sleep quality to hope and other cognitive-motivational constructs, one expects the two to be associated with hope. In turn, given that empirical findings indicate that hope can protect individuals from increased gambling intensity and severity (as found across two experiments and one study in Chapter 4), it is posited that hope would be negatively correlated with PG severity. Thus, it is hypothesised that healthy nutritional habits and adequate sleep are related to higher levels of hope and higher levels of hope are in turn associated with reduced PG severity among residents of deprived neighbourhoods.

In sum, despite Snyder's (1995) claim that nutritional intake and sleep quality can foster hope, there is little-to-no direct evidence in support of this claim. However, as highlighted above, there is some indirect evidence that good quality sleep and nutritional habits may foster hope, which merits exploration as higher levels of hope can protect at-risk individuals from a range of maladaptive behaviours including PG (as evidenced in Chapter 4). Thus, this exploratory study aims to test whether good quality sleep and nutritional habits are associated with increased levels of hope and whether higher levels of hope are in turn associated with reduced PG severity among residents of deprived neighbourhoods. Accordingly, Study 2 aims to examine whether self-report assessment of nutritional habits and sleep quality predict hope and whether hope in turn predicts PG severity as assessed by the PGSI. Age and gender were included as covariates in the analyses as research findings indicate that both of these variables influence gambling behaviour (see Johansson et al., 2009).

5.2.4 Methods

Participants

Consistent with Study 1, snowball sampling was used to recruit participants online, which led to 375 participants voluntarily completing a survey advertised online (*Facebook*, *Twitter* and forums). However, 161 participants resided in the 50% *least* deprived neighbourhoods in England (identified by the English Index of Multiple Deprivation (IMD)) and were excluded from analyses. The remaining 214 participants' (32 females, 180 males and 2 who preferred not to disclose their gender) data were used for analyses. All 214 participants, whose age ranged from 18-75 years old (M = 37.44, SD = 15.20), resided in the 50% *most* deprived neighbourhoods in England; other studies have also used a 50% most deprived cut-off to conduct research related to neighbourhood deprivation (e.g., Ahern, Caton, Blundell-Birtill & Hetherington, 2019; Milton, Pliakas, Hawkesworth, Nanchahal, Grundy, Amuzu et al., 2015; Steiner, Lowe, Beckford, Blakey, Bolton, Elkin et al., 2017).

Materials

In addition to the Adult Hope Scale and the PGSI (identical to those used in Study 1), the (1) English Index of Multiple Deprivation (IMD), (2) Health Promoting Lifestyle Profile II (HPLP II) and (3) Pittsburgh Sleep Quality Index (PSQI) were used to collect data.

English Index of Multiple Deprivation (IMD)

The English indices of deprivation (Smith et al., 2015) is recognised as a valid marker of neighbourhood deprivation in England. Data collected from multiple government and non-government agencies is used to produce an overall IMD score for each postal code in England. More specifically, the IMD score for each postal code is generated based on seven distinct domains of deprivation: income (22.5%); employment (22.5%); health and disability

(13.5%); education, skills and training (13.5%); barriers to housing and services (9.3%); crime (9.3%); and living environment (9.3%). Each IMD score generated falls within 1 of 10 deciles (1 = 10% most deprived; 2 = 20% most deprived … 9 = 20% least deprived; and 10 = 10% least deprived). In this study, all participants whose postal code fell within the first 5 deciles (50% most deprived) were included in the analyses. The publicly available English indices of Deprivation 2015 postcode lookup tool was used to match each participant's postcode to their IMD score and decile rank.

Nutritional Habits

The nutrition subscale of the Health Promoting Lifestyle Profile II (HPLP II: Walker & Hill-Polerecky, 1996) was used to assess participants' nutritional habits. The HPLP is a 52-item scale that assesses health-promoting behaviours on six subscales: health responsibility (9 items); physical activity (8 items); nutrition (9 items); spiritual growth (9 items); interpersonal relations (9 items); and stress management (8 items). With permission from the HPLP developers, the 9-item nutrition subscale was used to assess participants' nutritional habits. Respondents rated the frequency in which they practiced each of the nine habits (e.g., eat 3-5 servings of vegetables each day) on a four-point Likert scale (1 = never, 2 = sometimes, 3 = often, 4 = routinely). The total score of the 9 items was used for analysis with greater scores indicating healthier nutritional habits. Cronbach's α for the nutrition subscale used in this study was 0.79.

Sleep Quality

A slightly modified version of The Pittsburgh Sleep Quality Index (PSQI: Buysse, Reynolds, Monk, Berman & Kupfer, 1989) was used to assess participants' sleep quality. The original PSQI is a 19-item scale that assesses subjective sleep quality. The first 5 questions of the scale are related to sleep duration and latency (e.g., how many hours of actual sleep did you

get at night?) and were excluded from the modified version used in this study. The remaining 14 questions were more directly related to sleep quality and were included in the modified version administered to participants. 13 of the questions on the modified version required respondents to rate how often they experienced issues with sleep or staying awake (e.g., during the past month, how often have you had trouble sleeping because you cough or snore loudly) on a four-point Likert scale (0 = not during the past month; 1 = less than once a week; 2 = once or twice a week; 3 = three or more times a week). The final question required respondents to rate their sleep quality during the past month on a four-point Likert scale (0 = very good; 1 = fairly good; 2 = fairly bad; 3 = very bad). The total score of the 14 items was used for analyses with greater scores indicating worse sleep quality. Cronbach's α for the modified version used in this study was 0.73.

Procedure

A survey created on *Qualtrics* was advertised online (*Facebook*, *Twitter* and forums). The post included a link to the survey and an invitation letter that highlighted, to complete the questionnaire study, one must (1) be 18 years of age or over, (2) reside in England, and (3) have gambled at least once in the past 12 months (see Appendix E); these three conditions were again specified on the consent form. On the online questionnaire, participants were asked to provide demographic information (age and gender) which were used as covariates in the analyses, and their home postal code which was used to identify their IMD score. Additionally, the online survey included the nutritional habits subscale extracted from the HPLP II, the modified PSQI, The Adult Hope Scale, and the PGSI.

Data Analyses

Two parallel mediation analyses were conducted using Hayes' (2013) PROCESS macro for SPSS[2]. In the first mediation model, nutritional habits was entered as the predictor variable, both agency and pathways thinking as the mediating variables, and absolute PGSI as the outcome variable; controlling for age, gender and sleep quality. In the second mediation model, all the variables remained the same but the predictor variable which was substituted with sleep quality and thus nutritional habits was entered as a covariate variable. A bootstrapping procedure (with bias corrected confidence intervals (CI)) was used to estimate indirect effects (Preacher & Hayes, 2008). The number of bootstrap samples were kept as 5000 and statistical significance of indirect effects were determined by 95% CIs (significant effects indicated by a confidence interval that does not contain zero).

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[2] Two parallel mediation analyses were conducted, as opposed to one model including both predictor variables because PROCESS does not have a mediation model that allows for more than one predictor variable to be entered. As reported by Hayes (2017): "in order to estimate the direct and indirect effects of all k X variables, PROCESS must be executed k times, each time putting one Xi in the model as X and the remaining k – 1 X variables as covariates. Each time PROCESS is run, the direct and indirect effects of the variables listed as X will be generated. Repeating k – 1 times generates the indirect effects for all k X variables. Mathematically, all resulting paths, direct, and indirect effects will be the same as if they had all been estimated simultaneously as in a structural equation modelling program" (*pp*. 196).

5.2.5 Results

Pearson's correlation (see Table 5.1) demonstrated that all variables used in analyses met multicollinearity assumptions (e.g., r < .8). Additional analyses also confirmed that multicollinearity assumptions were met (e.g., *Tolerance* > .1; and *VIF* < 10).

Table 5.1

Pearson's Correlation for all Variables Included in the Mediation Analyses

	Gender	Agency	Pathways	Nutrition	Sleep	PGSI
Age	.044	.002	.041	.193**	-.031	-.278**
Gender		-.026	-.128*	.003	.076	-.211**
Agency			.614**	.255**	-.368**	-.240**
Pathways				.202**	-.200**	-.069
Nutrition					-.131	-.264**
Sleep						.213**

*N = 214; * p < .05; ** p < 0.01*

Two parallel mediation analysis using PROCESS (Hayes, 2013) demonstrated an indirect effect of nutritional habits [*b* = -0.052, 95% *BCa CI* (-.109, -.008)] and sleep quality [*b* = 0.058, 95% *BCa CI* (0.010, 0.121)] on gambling severity (absolute PGSI) via agency thinking, indicating a significant partial mediation (see Figures 12 and 13)[3]. Both parallel mediation analyses demonstrated no indirect effect through pathways thinking. Both models had six missing data.

Figure 5.1

Model of nutritional habits as a predictor of gambling severity, mediated by agency thinking. The confidence interval for the indirect effect is a BCa bootstrapped CI based on 5000 samples (N = 208)

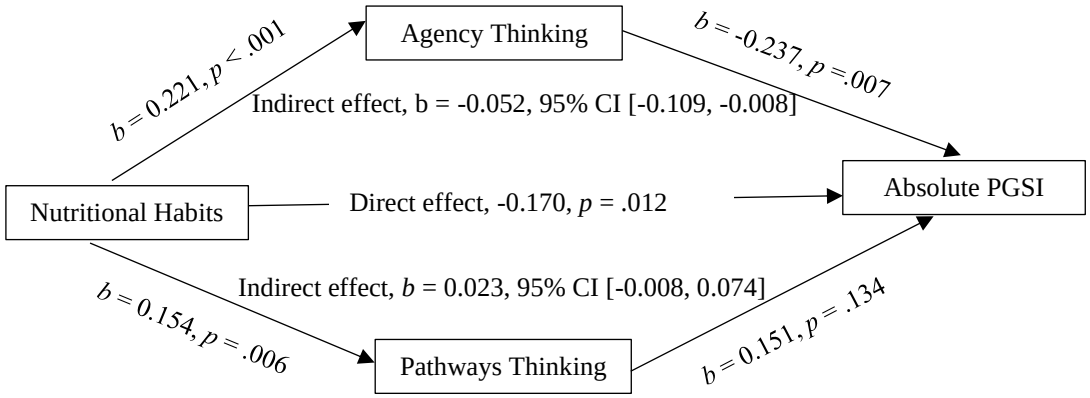
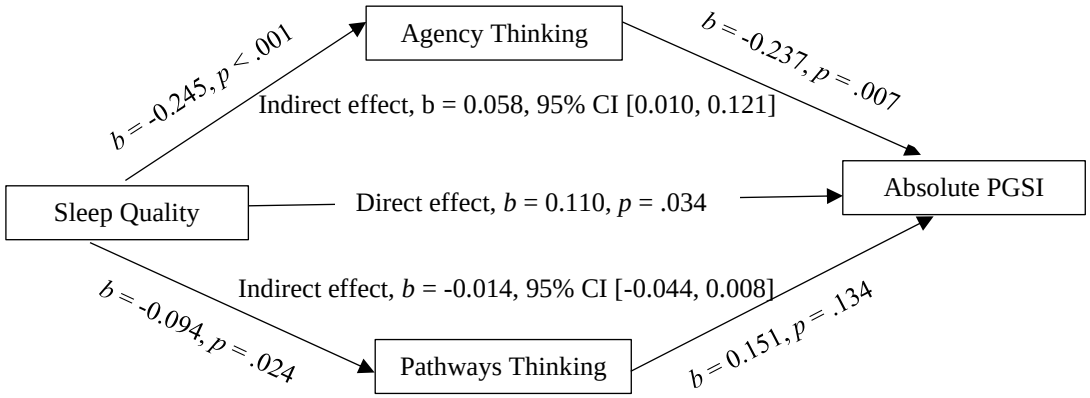


Figure 5.2

Model of sleep quality as a predictor of gambling severity, mediated by agency thinking. The confidence interval for the indirect effect is a BCa bootstrapped CI based on 5000 samples (N = 208)



[3]Although it is suggested that the PGSI – once converted into categories of non-problem, low-risk, moderate-risk, and problem gambling – should be treated as a continuous scale, it remains a concern that the scale shares more characteristics with an ordinal scale than a ratio scale (see Currie et al., 2013). As such, both mediation analyses conducted included absolute PGSI scores as the outcome variable. However, two additional mediation analyses were conducted, with all the same predictor variables, but the outcome variable substituted to categorized PGSI. Results from both mediation analyses demonstrated an indirect effect of nutritional habits [*b* = - 0.009, 95% *BCa CI* (-0.020, -0.001)] and sleep quality [*b* = 0.010, 95% *BCa CI* (0.001, 0.022)] on categorized PGSI via agency thinking. Both parallel mediation analyses revealed no indirect effect through pathways thinking. Therefore, the same pattern of results was repeated.

5.2.6 Discussion

As predicted, results show that among residents of deprived neighbourhoods, both nutritional habits and sleep quality predict PG severity and both relationships are mediated by hope (agency component). More specifically, healthier nutritional habits increased agency thinking, and agency thinking in turn reduced PG severity among residents of deprived neighbourhoods. Similarly, better-quality sleep increased agency thinking, which subsequently reduced PG severity. Therefore, these findings support suggestions that healthier lifestyles (e.g., healthier diets and adequate sleep) can foster hope (Snyder, 1995). Moreover, results that agency thinking reduced PG severity is consistent with other empirical findings that showed hope acts as a buffer against PG (Loo, Tsai, Raylu & Oei, 2014); these results are also consistent with findings in Chapter 4 that higher levels of agency thinking reduce gambling intensity and severity among at-risk individuals.

Although these findings indicate that nutritional habits and sleep quality predict PG severity through agency thinking, both of these were partial mediations. That is, both nutritional habits and sleep quality also have a direct effect (bypassing hope) on PG severity. Indeed, empirical findings reveal that nutritional intake (Alaimo, Olson & Frongillo, 2001; Black et al., 2015; Slack & Yoo, 2005) and sleep quality (Fallone, Owens & Deane, 2002; Meijer et al., 2010) directly impact both internalizing and externalizing behaviours. Moreover, there is some evidence that sleep deprivation is directly related to PG (see Fong, 2005). However, it remains unclear whether sleep deprivation causes PG or vice versa; while some studies report that sleep deprivation is a common consequence of gambling (i.e., problem gamblers lose hours of sleep due to gambling: e.g., Littman-Sharp, 2003), others suggest that lack of good quality sleep may prevent individuals from paying close attention and thus losing control of gambling (Fong, 2005). Similarly, there is some evidence that nutritional intake is directly

related to PG, though again it remains unclear whether PG causes bad nutritional habits or vice versa (see Chamberlain, Redden & Grant, 2017).

Results also indicate that although both nutritional habits and sleep quality are significantly related to pathways thinking, there is no association between pathways thinking and PG severity. Therefore, in this study, only agency thinking is significantly associated with PG severity among residents of deprived neighbourhoods; these findings are consistent with Snyder's (2002) claim that agency thinking "takes on special significance when people encounter impediments" (*pp*. 251). Similarly, one study found that agency thinking (and not pathways thinking) predicted psychological adjustments (Chang, 2003). In sum, results reveal that nutritional habits and sleep quality are directly and indirectly (through agency thinking) associated with PG severity; although the correlational design of this study prevents us from making definitive statements regarding causality, there is some encouragement that hope and predictors of hope (nutritional habits and sleep quality) may make for positive prevention and intervention in deprived neighbourhoods.

5.3 Study 3

While findings from Chapter 4 and Study 2 indicate that hope and predictors of hope can make for positive prevention and intervention among at-risk individuals, it is valuable to examine whether hope can also aid in the recovery process if problems were to emerge. Much evidence indicates that seeking help can aid in the recovery process (Brown, Evans-Lacko, Aschan, Henderson, Hatch & Hotopf, 2014; Dawson et al., 2006), however residents of deprived neighbourhoods are often reluctant to seek help (Cummings, 2014). Moreover, evidence from the gambling literature indicates that problem gamblers are also reluctant to seek help for their problems (Delfabbro et al., 2012; Lorains, Cowlishaw & Thomas, 2011; Slutske, 2006). Nonetheless, there is some evidence, as will be discussed below, that

individuals high in hope may be more willing to seek help than low-hopers (Boddy et al., 2018; Saleebey, 2006). Therefore, Study 3 aims to explore the relationship between hope and help-seeking intentions among residents of deprived neighbourhoods, a population at heightened risk of developing addictions (i.e., becoming addicted to gambling) (see Carrà et al., 2017; Livingstone, 2001; Wardle et al., 2014; Wheeler et al., 2006).

The relationship between help-seeking intentions and actual help-seeking has been established in the literature (see Deane, Ciarrochi, Wilson, Rickwood & Anderson, 2001; Wilson, Deane, Ciarrochi & Rickwood, 2005), therefore a positive association between hope and help-seeking intentions would suggest that hope can aid in the recovery process, which would be particularly advantageous among individuals at heightened risk of developing addictions. To elaborate, studies indicate that residents of deprived neighbourhoods are more likely to develop addictions than residents of affluent areas (Schneider & Gruber, 2013), which is supported by empirical studies that have found PG, smoking, and alcohol and drug abuse to be more prevalent in the most deprived neighbourhoods (Ayuka, Barnett & Pearce, 2014; Karriker-Jaffe, 2013; Shohaimi, Luben, Wareham, Day, Bingham, Welch et al., 2003; Wardle et al., 2014) . This is why it is important to examine factors that could encourage residents of deprived neighbourhoods to seek help when facing problems (i.e., gambling addictions).

Studies have consistently found that seeking help is one way in which individuals can recover from addictions (Dawson et al., 2006; Tracey, Sherry & Keitel, 1986). There is evidence that help from both professional (Martin, 2002) and non-professional (Brown et al., 2014) sources can aid recovery. For instance, research often indicates that seeking professional help is related to PG recovery (Nuske & Hing, 2013; Pallesen, Mitsem, Kvale, Johnsen & Molde,

2005). While few studies have examined the impact of non-professional help (i.e., help from family, friends and community gatekeepers) on PG recovery, there is some evidence that informal help plays a key role in the recovery of substance abusers (see Booth et al., 1992; Hogan et al., 2002). Generally, findings from the addiction literature indicate that informal sources of help are important to a recovering addict (see Booth et al., 1992). Overall, there is much evidence that both formal and informal help can aid the recovery process.

Although problem gamblers can aid their recovery process by seeking help, it is often acknowledged "that only a small proportion of people potentially affected by gambling seek formal help" (Delfabbro et al., 2012, *pp*. 349). In a similar vein, Slutske (2006) found that only 7-12% of problem gamblers seek help for their gambling problems. Other studies have found similar trends, that is, while treatment for gambling problems exist, very few problem gamblers tend to seek help for their problems (Cunningham, 2005; Petry, 2005; Suurvali, Hodgins & Cunningham, 2010); it is often reported that only 7-15% of problem gamblers seek help, a figure that has been reported in several countries (see Clarke et al., 2007; Duong-Ohtsuka & Ohtsuka, 2001; Productivity Commission, 1999; Slutske, 2006). In general, empirical findings reveal that there is a strong reluctance to seek help for addictions and mental illness (Burns, Eichenberger, Eich, Ajdacic-Gross, Angst & Rossler, 2003; Kessler, Demler, Frank, Olfson, Pincus, Walters et al., 2005), especially among residents of deprived neighbourhoods (Barker & Adelman, 1994; Cummings, 2014).

As highlighted above, those who need help the most are often the same individuals who are most reluctant to seek help (see Cummings, 2014; Cunningham, 2005; Slutske, 2006). However, there is some suggestion that hope may influence help-seeking intentions (Saleebey, 2006; Snyder, Feldman, Taylor, Schroeder & Adams III, 2000), which would be

particularly advantageous for individuals at heighted risk of developing addictions (i.e., residents of deprived neighbourhoods). One way in which hope, particularly agency thinking, may encourage help-seeking behaviour is by reducing the influence of help-seeking barriers such as stigma (see Baxter, Salmon, Dufresne, Carasco-Lee & Matheson, 2016; Möller-Leimkühler, 2002). As discussed in previous Chapters, agency thinking is the motivational component of hope that "ensures a person will be able to begin and sustain the effort necessary to follow a particular pathway" (Valle et al., 2006, *pp*. 395), and is illustrated by internal speech such as 'I am not going to stop' (Snyder et al., 1998). Therefore, while barriers may prevent some individuals from seeking help, those high in hope are likely to persist and seek help in the face of barriers. An alternative explanation is that individuals high in hope view help-providers more positively and are more optimistic of help outcomes; as put by Boddy and colleagues (2018) "people come into contact with social workers often because they are hopeful for a better and brighter future" (*pp*. 592) (see also Harris, 2008). This explanation is consistent with Snyder and colleagues' (2000) claim that high-hope individuals reserve a more positive attitude towards psychotherapists than low-hopers. In line with Snyder and colleagues' (2000) claim, it is argued that individuals with a strong sense of hope generally view others more positively (Snyder et al., 1997) and are more tolerant of others (Tierney, 1995), both of which may encourage high-hopers to consider help.

While research examining the direct relationship between hope and help-seeking intentions are scarce, there is some indirect evidence that higher levels of hope can encourage help-seeking behaviour. For example, high-hope individuals enjoy better relationships with both friends and family members than low-hopers (Kwon, 2002), thus individuals high in hope are likely to seek help from friends and families when facing impediments. Moreover, high-hope individuals have positive views about interpersonal relationships and form strong attachments

to others (Snyder, Cheavens & Sympson, 1997). High-hopers' positive views (Snyder et al., 1997) and tolerance (Tierney, 1995) of others may encourage them to seek help when facing difficulties. In support, empirical findings reveal that individuals with a strong sense of hope are likely to complete treatments (Irving et al., 2004). Another study found that individuals who seek support for mental illness score high in hope (Hodges, Hardiman & Segal, 2004). Based on these findings, it was posited that among residents of deprived neighbourhoods, hope will be positively correlated with both professional and non-professional help-seeking intentions for gambling-related problems.

To put the hypotheses to test, the relationship between hope and help-seeking intentions (professional and non-professional) among individuals residing in the 50% *most deprived* neighbourhoods in England (same cut-off as in Study 2) were examined. Research indicates that both age (Estes, 1995; Lebowitz & Niederehe, 1992) and gender (Addis & Mahalik, 2003; Ang, Lim & Tan, 2004) influence help-seeking intentions, thus these variables were included as covariates in both regression models conducted to test the effects of hope on (1) *professional*, and (2) *non-professional* help-seeking intentions. Moreover, the model controlled for previous help received from a mental health professional in the first regression model as empirical findings reveal that previous help received from a professional source is likely to influence future intentions to seek professional help (Wilson et al., 2005).

5.3.1 Methods

Participants

A total of 186 participants voluntarily completed a survey advertised online (*Facebook*, *Twitter* and forums). As in Study 2, participants who resided in the 50% *least* deprived neighbourhoods in England (N = 70) were excluded from analyses. The remaining 116

participants' (61 females, 54 males and 1 who preferred to not disclose their gender) data were used for analyses. All 116 participants, whose age ranged from 18-62 years old (M = 30.78, SD = 12.03), resided in the 50% most deprived neighbourhoods in England.

Materials

The English Index of Multiple Deprivation 2015 (IMD 2015) was used to identify neighbourhood deprivation deciles, where participants who resided in the 50% most deprived areas of England were used for analyses (as in Study 2). The online questionnaire comprised of The Adult Hope Scale (identical to that used in Study 2) and the General Help-Seeking Questionnaire (GHSQ: Wilson et al., 2005).

General Help-Seeking Questionnaire (GHSQ)

The GHSQ (Wilson et al., 2005) was used to assess participants' professional and non-professional help-seeking intentions. The GHSQ is an adaptable self-report scale that assesses intentions to seek help from a variety of sources when facing emotional problems or suicidal thoughts. That is, the scale can be modified to suit research questions, as explained below. Multiple sources of help are presented (e.g., friend, parent, mental health professional and Doctor/GP), and respondents are required to rate how likely they are to seek help from each available source on a seven-point Likert-type scale (1 = extremely unlikely – 7 = extremely likely). Both the sources of help and the question used to ask whether individuals are likely to seek help can be modified to suit research questions.

The following question was used in this study "if you were having a gambling-related problem, how likely is it that you would seek help from the following people?". Seven of the help sources from the original GHSQ were used in this study, grouped into two categories

using methods described by Deane and Wilson (2007). The two categories were: (1) professional help sources, which included a mental health professional (e.g., counsellor, psychologist and psychiatrist), a phone help line (e.g., lifeline) and a Doctor/GP; and (2) non-professional help sources, which included an intimate partner (e.g., significant boyfriend or boyfriend, husband or wife), a friend, a parent and other relative/family member. Indeed, it is common to group the sources of help from the GHSQ into the two categories stated (see Costin, Mackinnon, Griffiths, Batterham, Bennett & Christensen, 2009; Ryan, Shochet & Stallman, 2010; Wilson et al., 2005). The total score for each category was used for analyses, whereby greater scores indicated greater intentions to seek help. A final item required participants to indicate whether they had ever seen a mental health professional or not as this could influence future intentions to seek professional help. As the scale was used to assess both professional and non-professional help-seeking intentions, these were treated independent of one another when testing for internal consistency; Cronbach's α for the items used to assess professional help-seeking intentions was 0.79 and 0.82 for items used to assess non-professional help-seeking intentions.

Procedure

A questionnaire produced on *Qualtrics* was advertised online (*Facebook*, *Twitter* and forums). The post included a link to the questionnaire and an invitation letter that highlighted, to complete the questionnaire study. One must (1) be 18 years of age or over, and (2) reside in England (see Appendix F); both conditions were again specified on the consent form. As in Study 2, participants completing the online questionnaire were asked to provide demographic information (age and gender) and their home postal code which was used to identify their IMD score. Additionally, the online questionnaire included The Adult Hope Scale (as in Study 2) and the GHSQ.

Data Analyses

Two hierarchical regression models were conducted to examine whether agency or pathways thinking predict (1) professional and (2) non-professional help-seeking intentions. The first hierarchical regression model controlled for age, gender and previous contact with a mental health professional, while the second hierarchical regression controlled for age and gender. The rejection level for all analyses was set at $p = .05$.

5.3.2 Results

Pearson's correlation (see Table 5.2) demonstrated that all variables used in analyses met multicollinearity assumptions (e.g., r < .8). Additional analyses also confirmed that multicollinearity assumptions were met (e.g., *Tolerance* > .1; and *VIF* < 10).

Table 5.2

Pearson's Correlation for all Variables Included in the Regression Analyses

	Gender	Previous Help	Agency	Pathways	Professional Help	Non-Professional Help
Age	-.003	-.159	-.055	-.020	.196*	-.069
Gender		-.110	.081	-.128	.119	.149
Previous Help			.122	.143	-.480**	-.036
Agency				.699**	.032	.452**
Pathways					-.064	.250**
Professional Help						.279**

*N = 116; * p < .05; ** p < 0.01*

The first two-stage hierarchical regression was conducted with professional help-seeking intentions as the outcome variable. The covariate variables age, gender and previous help (from a mental health professional) were entered at stage one of the regression model and the two predictor variables agency and pathways thinking were entered at stage two of the model. Although the regression model was significant (see Table 5.3), neither component of hope

predicted professional help-seeking intentions; previous help from a mental health professional was the only significant predictor of professional help-seeking intentions.

Table 5.3

Summary of Regression Analysis for Predictors of Professional Help-Seeking Intentions

Variable	β	t	SE	R	R^2	ΔR^2	F	ΔF	ΔF p	p
Model 1 ***				**.50**	**.25**	**.25**	**12.41**	**12.41**	**.001**	**.001**
Age	0.05	1.50	0.03							.137
Gender	0.65	0.85	0.76							.398
Previous Help	-4.04	-5.42	0.75							.001
Model 2 ***				**.51**	**.26**	**.01**	**7.84**	**0.10**	**.373**	**.001**
Age	0.05	1.57	0.03							.120
Gender	0.39	0.49	0.79							.622
Previous Help	-4.11	-5.45	0.75							.001
Agency	0.14	1.40	0.10							.164
Pathways	-0.10	-0.89	0.11							.373

*Note. N = 116; *** p < .001*

The second two-stage hierarchical regression was conducted with non-professional help-seeking intentions as the outcome variable. The covariates age and gender were entered at stage one of the model[4] and agency and pathways thinking were entered at stage two. Significant results indicate that agency thinking (but not pathways thinking) predict non-professional help-seeking intentions among residents of deprived neighbourhoods (see Table 5.4).

[4] The covariate variable previous help from a mental health professional was entered at stage one of the hierarchical regression model. The same pattern of significant results was found: agency thinking was the only significant predictor of non-professional help-seeking intentions among residents of deprived neighbourhoods. Previous help from a mental health professional did not predict non-professional help-seeking intentions.

Table 5.4

Summary of Regression Analysis for Predictors of Non-Professional Help-Seeking Intentions

Variable	β	t	SE	R	R^2	ΔR^2	F	ΔF	$\Delta F\ p$	p
Model 1				**.16**	**.03**	**.03**	**1.56**	**1.56**	**.215**	**.215**
Age	-0.03	-0.73	0.04							.464
Gender	1.64	1.60	1.03							.111
Model 2 ***				**.47**	**.22**	**.20**	**7.97**	**14.02**	**.001**	**.001**
Age	-0.02	-0.51	0.04							.615
Gender	1.06	1.11	0.96							.270
Agency	0.50	4.20	0.12							.001
Pathways	-0.10	-0.76	0.14							.449

*Note. N = 116; *** p < .001*

5.3.3 Discussion

Consistent with predictions, among residents of deprived neighbourhoods, hope (agency component) is positively correlated with *non-professional* help-seeking intentions. However, a significant relationship between hope (neither component) and *professional* help-seeking intentions among the same residents was not found. Failing to detect a significant relationship between hope and professional help-seeking intentions among residents of deprived neighbourhoods could be due to several reasons such as reserving negative attitudes towards seeking professional help (Jang, Kim, Hansen & Chiriboga, 2007), costs of accessing professional help (e.g., transportation cost: Fortney, Rost, Zhang & Warren, 1999; Mojtabai, 2009; Sareen, Jagdeo, Cox, Clara, ten Have, Belik et al., 2007) and more broadly, a lack of understanding on how and where to seek professional help (Fox, Blank, Rovnyak & Barnett, 2001). However, findings that agency thinking is positively correlated with intentions to seek non-professional help is still an important finding because there is evidence that individuals seeking non-professional help are more likely to later seek professional help (Clarke et al., 2007), which can in turn play a crucial role in recovery. Moreover, there is evidence that seeking informal help can directly influence health outcomes and recovery (O'Donnell,

Stueve, Wardlaw & O'Donnell, 2003). Therefore, a significant relationship between agency thinking and non-professional help-seeking intentions among residents of deprived neighbourhoods is particularly valuable as research indicates that non-professional help can aid recovery process.

Overall, findings that hope is positively correlated with informal help-seeking intentions is useful because (1) relationships between intentions to seek help and actual help-seeking have been established (Deane et al., 2001; Wilson et al., 2005), and (2) seeking informal help can aid recovery by encouraging individuals to seek professional help in the future (e.g., family and friends may encourage individuals to seek professional help). To elaborate, there is evidence that informal sources of help can encourage individuals to seek professional help (Vogel, Wade, Wester, Larson & Hackler, 2007), consistent with claims that "families are thought to be significant pathways to help-seeking" (Clarke et al., 2007, *pp*. 293) (see also Rothi & Leavey, 2006). For instance, parents play a key role in whether children and adolescents seek help from mental health services or not (Logan & King, 2001). For adults, intimate partners are likely to influence professional help-seeking (Tudiver & Talbot, 1999). In a similar vein, there is evidence that friends and family members are likely to seek professional help on behalf of individuals facing problems (e.g., Cairns, Reid & Murray, 2015; O'Grady, Wadsworth, Willerton, Cardin, Topp, Mustillo & Lester, 2015; Rickwood, 2002), thus approaching informal sources can be the pathway to professional help. As intentions predict actual behavior (Ajzen, 1985; 1991), these findings suggest that agency thinking may increase the likelihood of seeking help among a population who is otherwise reluctant to seek help (Cummings, 2014); this is particularly beneficial as both informal and formal help can aid recovery (Brown et al., 2014; Martin, 2002). Although findings from this exploratory study are encouraging, future research is required to test causality.

5.4 General Discussion

Consistent with predictions, in Study 2, it was found that among residents of deprived neighbourhoods, healthier nutritional habits and better-quality sleep increase hope, and higher levels of hope in turn reduce PG severity. More specifically, these findings show that among residents of deprived neighbourhoods, the agency component of hope is significantly associated with PG severity, which supports claims that agency thinking is particularly important when facing impediments (Snyder, 2002). While the analyses reported in this Chapter are largely exploratory since there has been little-to-no previous research of this kind, findings suggest that strategies to promote hope in deprived neighbourhoods may impact engagement in maladaptive behaviours and thus merits further research. Moreover, findings indicate that both healthier nutritional habits and better-quality sleep directly influence PG severity, therefore assessing causality in future research will reveal whether (or not) hope, nutritional habits and sleep quality can make for positive preventions and interventions among populations otherwise at risk of problem behaviours. This is especially valuable as both nutritional habits and sleep quality are simple to adjust at individual level.

Results from Study 3 revealed that among residents of deprived neighbourhoods, hope, agency component of hope to be precise, predicted non-professional help-seeking intentions. This may be because individuals high in agentic thinking are less likely to be influenced by help-seeking barriers (i.e., stigmatisation), consistent with claims that agency thinking is particularly important in the face of obstacles (Snyder, 2002). This suggests that in addition to reducing the likelihood of problems developing (i.e., severe PG), agency thinking can also aid recovery if problems (i.e., gambling-related problems) were to appear. One suggests that these findings should encourage future research to establish causality as seeking informal help can increase the likelihood of seeking professional help (Vogel et al., 2007), which can

in turn aid recovery (Martin, 2002). Additionally, informal help can directly influence recovery (Brown et al., 2014), thus establishing whether hope causes intentions to seek help or not can embolden the need to foster hope in communities at heightened risk of facing addictions and mental health problems (i.e., deprived neighbourhoods). Lastly, assessing the relationship between hope and help-seeking intentions to determine causality is particularly advantageous as studies have revealed help-seeking intentions predict actual help-seeking behaviour (Deane et al., 2001; Wilson et al., 2005).

In sum, although the nature of these studies prevent us from claiming causality, there is some encouragement that hope, and predictors of hope (nutritional intake and sleep quality) can make for positive preventions and interventions among residents of deprived neighbourhoods who are often at risk of engaging in maladaptive behaviours (i.e., excessive gambling) to cope with neighbourhood stressors and the accompanying negative emotions (see Slutske et al., 2019). Moreover, findings that hope is positively correlated with informal help-seeking intentions among residents of deprived neighbourhoods suggests that hope can also aid recovery if gambling-related problems were to appear; this is particularly useful as studies have found a relationship between neighbourhood deprivation and PG (Barnes et al., 2013; Livingstone, 2001; Wardle et al., 2014). Although there is a need to establish causality in future research, these findings have real-world implications as will be discussed below.

5.4.1 Implications, Applications and Suggestions for Future Research

As previously highlighted, there is a relationship between neighbourhood deprivation and PG (e.g., Wardle et al., 2014). Consequently, it is suggested that restricting gambling opportunities and providing selective prevention programs in deprived neighbourhoods is essential to protecting residents of deprived neighbourhoods from PG (see Astbury &

Thurstain-Goodwin, 2015; Carrà et al., 2017; Pearce et al., 2008; Wardle et al., 2014). While reducing the availability of gambling facilities/venues in deprived neighbourhoods can protect individuals residing in deprived neighbourhoods, results indicate that enhancing hope is another way to protect these residents from severe PG. With gambling now more accessible than ever (online), findings that enhanced hope levels, good quality sleep and nutritional habits are associated with reduced PG severity among residents of deprived neighbourhoods merits further discussion and research (i.e., intervention-based studies). Put differently, these findings suggest that good quality sleep and nutritional habits enhance hope and in turn reduce PG severity among residents of deprived neighbourhoods. Therefore, if causality is established, charities and governmental bodies can devise ways of encouraging healthier nutritional and sleep habits.

In this Chapter, a positive correlation between agency thinking and informal help-seeking intentions among residents of deprived neighbourhoods (Study 3) was also found. If causality is established, then gatekeepers of deprived neighbourhoods can be trained to foster hope among residents of their community, who may otherwise be reluctant to seek help in the face of impediments. Teachers and clergy often act as community gatekeepers (e.g., Leane & Shute, 1998; Youssef & Deane, 2005); training gatekeepers to foster hope within communities may in turn increase the likelihood to seek help, which is advantageous in deprived communities whose residents are often reluctant to seek help (Cummings, 2014). Alternatively, if future research discovers that nutritional intake and sleep quality *cause* changes in hope levels, then governmental bodies and charities may consider encouraging healthier nutritional and sleep habits to enhance hope levels, which can in turn prevent the onset of PG.

To conclude, these findings indicate that hope and predictors of hope may make for positive preventions and interventions among residents of deprived neighbourhoods. Additionally, results indicate that hope is associated with help-seeking intentions among residents of deprived neighbourhoods, which suggests that in addition to preventing the emergence of gambling problems, hope may also be useful if gambling-related problems were to appear. However, to be more assertive about the real-world implications suggested in this Chapter, future research which assess the causal relationship between hope, predictors of hope and engagement in maladaptive behaviours (gambling or others) and help-seeking intentions is encouraged, especially as findings from the two exploratory studies above are promising.

6 Chapter 6: General Discussion

6.1 Introduction

Initially, due to the inconsistencies reported in the gambling literature, the present thesis stated the need to reconsider the role of arousal and mood on gambling behaviour; in so doing, findings support claims that there are two subtypes of gamblers: escape-seekers and enhancement gamblers (see Blaszczynski & Nower, 2002; Lesieur, 2001; McCormick, 1988; Stewart et al., 2008). Consequently, as evidence from the gambling literature indicates that escape-seekers are the more vulnerable subtype of gamblers (see Goldstein et al., 2014; Stewart et al., 2008), the remainder of the thesis examined whether hope and potential predictors of hope serve as buffers against increased gambling intensity and PG severity among escape-seekers (i.e., populations of gamblers whose motives for gambling derive from the need to cope with/escape unpleasant states). Results indicate that hope can make for positive prevention and intervention among at-risk individuals and may aid in the recovery process if gambling-related problems were to appear. These findings suggest that, in future, the development of gambling intervention programs could usefully consider methods of fostering hope. In the remainder of the current discussion Chapter, the implications of the overall findings and how they can encourage future research will be discussed. However, first, a brief summary of each Chapter will be provided.

6.2 Summary of Chapters

Chapter 1 set the scene with an overview of the adverse consequences of PG. The many forms of negative consequences (i.e., financial hardship, employment and relationship issues and mental health problems: see Fong, 2005) associated with excessive and problematic gambling have encouraged scholars to examine factors that play a role in the transition from

recreational to PG. In reviewing the gambling literature, it was found that a wealth of empirical research, as well as prominent models and theories of gambling, claim that arousal and valence (i.e., negative or positive affective state) are two factors that encourage gambling behaviour (see Sharpe, 2004; Wulfert et al., 2005). More specifically, it is often reported that individuals use gambling to either (1) temporarily allay aversive states (i.e., cope with/escape negative events and valence) (e.g., Blaszczynski, 2000), or (2) overcome states of under-arousal (e.g., Schmidt et al., 2013). While an extensive amount of research reveals that gambling to increase arousal levels and/or to cope with/escape aversive states can lead to excessive and potentially problematic gambling (e.g., Anderson & Brown, 1984; Kim et al., 2006; Mercer-Lynn et al., 2013; Petry et al., 2005), there remains some scepticism in the literature (e.g., Breen & Zuckerman, 1999; Dickerson et al., 1992; Hills et al., 2001; Mishra et al., 2010).

To sum, in Chapter 1 of the present thesis, a review of the gambling literature revealed that while a substantial amount of empirical research indicates that motives to increase arousal levels or escape aversive states encourage gambling, there remains some inconsistencies. Yet, prominent models and theories of PG continue to assert that gambling to increase arousal levels and/or to cope with/escape negative events and valence lead to the development and maintenance of PG (see Blaszczynski et al., 1990; Blaszczynski & Nower, 2002; McCormick, 1988; Stewart et al., 2008). As current theories and models of PG can be used to develop intervention and treatment programs, it is important to either propose a testable explanation for the inconsistencies, and in so doing, provide additional evidence that arousal and valence impact gambling or reconsider the role of arousal and valence on gambling behaviour.

As a possible means of resolving the inconsistencies in the gambling literature, Chapter 2 examined whether arousal and valence in interaction offers a more promising framework within which to understand motives for gambling. A look to the literature on affect reveals that affect is a multidimensional construct that consists of two key elements: arousal and valence (see Russell & Barrett, 1999). Put differently, the mixed results in the gambling literature may be due to some empirical studies examining the two dimensions of affect (arousal and valence) in isolation. This is consistent with Mano's (1992) argument that "negative affect accompanied by high arousal will lead to quite different judgmental processes and outcomes than negative affect and low arousal, or negative affect and intermediate arousal" (*pp*. 241). Indeed, others have also found that judgments and decisions are dependent on the interplay between arousal and valence (see Di Muro & Murray, 2012).

Across two studies in Chapter 2, it was found that arousal and valence in interaction predict changes in gambling intensity. A look to the literature on affect helped interpret these findings; for instance, there is evidence that arousal reflects the intensity of bipolar valence (i.e., severity of negative or positive mood) (see Bradley et al., 2001). As put by Kuppens and colleagues (2013): "arousal equals the intensity or extremity of positive and negative valence" (*pp*. 920). Findings indicate that as the severity of negative affect increased (via increases in physiological arousal), so did gambling intensity, which is consistent with the notion that some gamblers (subtype of gamblers often referred to as escape-seekers: see Lesieur, 2001) rely on excessive gambling to cope with/escape their aversive state (see also Blaszczynski & Nower, 2002). Results also reveal that as positive affect increased (via increases in physiological arousal), gambling intensity decreased, which is consistent with the notion that some gamblers (subtype of gamblers often referred to as enhancement gamblers:

see Stewart et al., 2008) use gambling to enhance positive affect (i.e., seek increases in arousal/excitement to overcome boredom) (see Goldstein et al., 2014; Stewart et al., 2008).

Results from Chapter 2 show that an interplay between arousal and mood provides a better framework for understanding motives for gambling. These findings help explain some of the mixed results in the gambling literature, which have predominantly examined the role of arousal and valence on gambling behaviour in isolation. In offering an explanation for the inconsistencies reported in the gambling literature, findings in Chapter 2 also provide further support for claims that there are two primary subtypes of gamblers, those who gamble to cope with/escape unpleasant states and those whose motives for gambling derive from desires to enhance positive affect (see Goldstein et al., 2014; Stewart et al., 2008). In sum, findings from Chapter 2 provided further support that there are two subtypes of gamblers, which supports the development of specific targeted interventions that will be differentially effective across these subtypes.

In Chapter 3, a look to the gambling literature indicated that escape-seekers face more overall gambling problems than enhancement gamblers (see Goldstein et al., 2014; Stewart et al., 2008). Consequently, the remainder of Chapter 3 discussed how hope, a psychological construct rooted in Positive Psychology, may buffer against increased gambling intensity and PG severity among individuals who resemble escape-seekers (i.e., individuals who use gambling to temporarily disengage from negative events and/or emotions). In short, Chapter 3 reviewed the literature on gambling and Positive Psychology to understand (1) why some individuals use gambling to cope with/escape their problems and aversive states while others do not, and (2) how hope can protect these escape-seekers from excessive and potentially problematic gambling.

Research from the gambling literature indicates that escape-seekers use gambling when they have no (or little) other means of dealing with and/or overcoming their problems and accompanying negative emotions (see Callan et al., 2008; Callan et al., 2011; Nower & Blaszczynski, 2005); as put forward by Nower and Blaszczynski (2005), escape-seekers "display a lifelong inability to cope with stress in active ways" (*pp*. 292). Put differently, the inability to use positive coping strategies (i.e., problem or solution-focused strategies) will encourage individuals facing problems and negative emotions to "avoid stressors by mentally disengaging (gambling, watching television, playing video games) or physically disengaging (shopping, sleeping, partying) from stressors" (Nower & Blaszczynski, 2005, *pp*. 292). Therefore, having multiple pathways to cope with stressors and accompanying negative emotions should reduce desires to use maladaptive coping strategies (i.e., excessive gambling) to temporarily escape problems and aversive states. Moreover, while alternative and more effective ways of dealing with negative events and emotions may be available to individuals, a lack of 'willpower' to use those more effective strategies may encourage individuals to continue relying on disengagement behaviours; this is consistent with the notion that individuals with less willpower are more prone to addiction (see Knapp & Karabenick, 1985; West, 1991).

A review of the gambling literature in Chapter 3 indicated that some individuals use gambling to cope with and/or escape negative events and emotions because (i) they are less likely to produce multiple alternative and effective ways of dealing with their problems and emotions, thus relying on disengagement behaviours such as excessive gambling, and (ii) when more positive means of dealing with their problems and negative emotions are available, they lack the willpower to use such alternative pathways, instead relying on disengagement behaviours to temporarily escape problems and aversive states. Consequently,

the remainder of Chapter 3 discussed how hope, a psychological construct rooted in Positive Psychology, may protect escape-seekers from excessive and potentially problematic gambling. Empirical findings reveal that individuals high in hope are (a) capable of producing multiple plausible pathways for goal attainment, and (b) possess the motivational strength (i.e., willpower) to pursue goals in the face of adversity (Snyder, 1994). Therefore, Chapter 3 was concluded by suggesting that high-hope individuals should have the tools to deal with problems and negative emotions in more positive ways, in turn eliminating/reducing desires to gamble excessively as a means of escaping problems and negative emotions. Consistent with earlier suggestions, empirical studies have found that high levels of hope can reduce both externalising and internalising behavioural problems (see Chang, 1998; Valle et al., 2006).

In sum, in Chapter 3 it was discovered that escape-seekers are likely to face more overall gambling problems than enhancement gamblers (see Goldstein et al., 2014; Stewart et al., 2008). More specifically, a look to the gambling literature revealed that escape-seekers may have little to no other means of coping with problems and negative emotions, and/or lack the willpower to cope with their adversities in more effective ways, thus they are likely to get caught in a vicious cycle of gambling excessively to escape from their continuous problems that are only likely to magnify during gambling. However, a look to the literature on Positive Psychology suggests that hope may serve as a buffer against excessive and potentially problematic gambling among populations resembling escape-seekers. Examining whether hope can protect at-risk individuals from increased gambling intensity and PG severity is useful as there is a wealth of evidence that hope can be fostered (see Snyder, 2002; Snyder et al., 1997). Thus, Chapter 4 examined whether hope can protect the relatively deprived – a

population known to experience a range of negative emotions (i.e., resentment) stemming from feelings of RD – from increased gambling intensity and PG severity.

As discussed in Chapter 4, empirical studies reveal that the relatively deprived engage in a range of harmful disengagement behaviours (i.e., excessive gambling) to cope with and/or escape negative emotions stemming from RD (see Callan et al., 2008; Callan et al., 2011; Smith et al., 2012). Thus, the relatively deprived resemble escape-seekers whose desire to gamble stems from the need to temporarily allay negative emotions (i.e., feelings of resentment stemming from RD). Chapter 3 concluded that hope may protect escape-seekers from increased gambling intensity and PG severity. To put this hypothesis to test, in Chapter 4, across 3 studies it was examined whether higher levels of hope reduce gambling intensity (Experiments 3 & 4) and PG severity (Study 1) among the relatively deprived, a population who is likely to gamble excessively to cope with feelings of RD and its accompanying negative emotions.

As predicted, findings in Chapter 4 reveal that in the face of RD higher levels of hope reduce gambling intensity and PG severity. Results are consistent with findings in the Positive Psychology literature which report that remaining hopeful in the face of adversities can be advantageous (see Snyder, 2002; Valle et al., 2006). In sum, these findings suggest that fostering hope in at-risk individuals can protect them from increased gambling intensity and PG severity, which is of great value as a wealth of evidence reveals that hope can be fostered via structured programs (i.e., the 'Making Hope Happen' program: see Edwards & Lopez, 2000). Moreover, there is some suggestion that adequate sleep and healthy nutritional intake can also enhance hope levels (see Snyder, 1995) which would be particularly beneficial as making adjustments to nutritional intake and sleep habits are not overwhelmingly difficult.

Despite the benefits of fostering hope via changes to nutritional intake and sleep habits, a look to the literature suggests that there are little-to-no empirical studies examining this relationship. Consequently, in Chapter 5 of the current thesis, an exploratory research was conducted to examine whether sleep quality and nutritional habits are related to levels of hope.

Chapter 5 examined whether good quality sleep and nutritional habits are related to higher levels of hope and whether higher levels of hope are in turn related to reduced PG severity among residents of deprived neighborhoods, another population resembling escape-seekers and thus at heightened risk of gambling excessively. This relationship was examined among residents of deprived neighbourhoods (as opposed to the relatively deprived) as it allowed us to test whether hope can make for positive prevention and intervention in a variety of at-risk populations who share characteristics with escape-seekers. Indeed, empirical evidence suggests that, like escape-seekers, residents of deprived neighbourhoods view excessive gambling as a way of coping with/escaping problems and aversive states (see Slutske et al., 2019).

Results from Chapter 5 show that among residents of deprived neighbourhoods, both good quality sleep and nutritional habits are associated with higher levels of hope and higher levels of hope are negatively correlated with PG severity, that is, as hope levels increase, PG severity decrease. These findings are consistent with suggestions that healthier lifestyles can foster hope (Snyder, 1995). Moreover, these findings are consistent with the notion that hope can serve as a buffer against PG (see Loo et al., 2014), which is also consonant with findings from Chapter 4 that higher levels of hope reduce gambling intensity and PG severity among at-risk populations. Therefore, as well as finding a relationship between healthier lifestyle

habits and hope, results from Chapter 5 provide further support for the notion that hope can make for positive prevention and intervention among a range of populations resembling escape-seekers.

Across 2 Chapters, findings show that hope can protect at-risk populations from excessive and potentially problematic gambling, which indicates that hope can make for positive prevention and intervention. However, at-risk populations (i.e., residents of deprived neighbourhoods) may have already fallen into a vicious cycle of engaging in maladaptive behaviours (e.g., excessive gambling) to disengage from their problems and aversive states. Therefore, it is beneficial to examine whether hope can also aid in recovery processes when problems have already emerged (i.e., when it may be too late for prevention and intervention). Empirical studies indicate that one effective way in which individuals can recover from harmful consequences (i.e., PG) is to seek help (Brown et al., 2014; Dawson et al., 2006; Nuske & Hing, 2013). Therefore, in a separate exploratory study in Chapter 5 (Study 3), it was explored for the first, whether higher levels of hope among residents of deprived neighbourhoods increased help-seeking intentions.

Results from Study 3 revealed that hope is positively correlated with non-professional help-seeking intentions among residents of deprived neighbourhoods. This is an important finding because (1) a relationship between intentions to seek help and actual help-seeking have been established in the literature (see Deane et al., 2001; Wilson et al., 2005), (2) empirical studies have found that non-professional help can directly improve health outcomes and recovery (see O'Donnell et al., 2003), and (3) individuals seeking non-professional help are likely to later seek professional help (see Clarke et al., 2007; Vogel et al., 2007), which is especially advantageous as empirical studies have consistently found that seeking professional help is

related to PG recovery (e.g., Nuske & Hing, 2013). Furthermore, findings that hope is positively correlated with non-professional help-seeking intentions among individuals residing in deprived neighbourhoods is valuable as empirical studies indicate that residents of deprived neighbourhoods and/or problem gamblers are often reluctant to seek help for their problems (see Cummings, 2014; Delfabbro et al., 2012; Lorains et al., 2011).

In sum, while the nature of Study 2 prevents us from claiming causality, there is some encouragement that hope and predictors of hope (nutritional intake and sleep quality) can make for positive preventions and interventions among at-risk individuals. Moreover, findings that hope is positively correlated with help-seeking intentions among residents of deprived neighbourhoods (Study 3) suggest that as well as making for positive prevention and intervention, hope can also aid in recovery processes, though again, there is a need to test for causality. This is particularly valuable as empirical studies have found a relationship between neighbourhood deprivation and a range of addictions such as alcohol abuse and PG (see Barnes et al., 2013; Carrà et al., 2017; Livingstone, 2001; Wheeler et al., 2006). In short, results suggest that fostering hope among at-risk populations (i.e., residents of deprived neighbourhoods) can be beneficial as it could prevent the onset of problems (i.e., severe PG) and aid recovery processes (via seeking help) if problems (i.e., gambling-related problems) were to emerge.

Overall, results in the current thesis have provided an explanation for the inconsistencies found in the literature regarding the relationship between arousal, mood and gambling behaviour. In doing so, further support was provided for claims that there are two primary subtypes of gamblers: (1) individuals who gamble to cope with/escape negative events and emotions (escape-seekers), and (2) those who gamble to enhance positive affect

(enhancement gamblers). A review of the gambling literature indicated that escape-seekers are more vulnerable to developing PG than other subtypes of gamblers, thus the remainder of the current thesis focused on whether hope and predictors of hope can protect populations resembling escape-seekers from PG. Consistent with predictions, these findings reveal that hope and predictors of hope can make for positive prevention and intervention among populations resembling escape-seekers. Moreover, findings that hope is positively correlated with help-seeking intentions suggest that in addition to preventing the emergence of problems among at-risk individuals, hope may also aid recovery processes if gambling-related problems were to appear; that is, high-hope individuals are more likely to seek help for their problems (though future studies are required to establish causality).

Now that a brief summary of each Chapter has been provided, in the remainder of the current discussion Chapter, the implications of findings and how they can encourage future research will be discussed. In so doing, there will be a focus on how findings from this thesis can inform future health promotions geared towards protecting at-risk populations from excessive and potentially problematic gambling.

6.3 Implications, Applications and Suggestions for Future Research

Prior to discussing the implications, applications, and suggestions for future research, it is important to note that the experiments and studies in this thesis have some limitations. It is important to recognise that the majority of participants in the first four experiments were female psychology undergraduates, thus it is unclear whether (or not) the findings from these experiments can be generalised to the general population. Similarly, the use of snowball sampling in Studies one to three meant that a similar number of female and male participants were not recruited in two of these studies, thus findings should be interpreted with some

caution. Finally, due to budgetary/financial constraints, not all participants in Experiments one to four received money for points gained during the risk game, though empirical evidence indicates that such a payment structure does not impact behavior (see Charness, Gneezy & Halladay, 2016).

Despite these limitations, findings across experiments and studies in this thesis indicate that hope can protect at-risk individuals from risky behaviors. More specifically, findings that agency-thinking reduces risk-taking and gambling severity among a relatively deprived population (as demonstrated across two experiments and one study) can have real-world implications and thus merits further discussion, especially as results from these experiments and studies suggest that hope may make for positive interventions in cases of problem gambling. Moreover, these findings should encourage scholars to conduct intervention-based studies to examine whether hope can be used as an intervention in cases of problem gambling and similar maladaptive behaviors. This is especially important as PG has been recognised as a public health concern in many countries (Brown, 2000; Brown & Raeburn, 2001; Delfabbro et al., 2012). Research indicates that approximately 1-2% of the population at any given time are problem gamblers (Browne, Greer, Rawat & Rockloff, 2017; Griffiths, 2009; Neal, Delfabbro & O'Neil, 2005).

Despite the gambling prevalence, it is understood that only a small proportion of problem gamblers seek help for their problems (Delfabbro et al., 2012), which is why "there is interest in whether interventions might be more effectively targeted towards gamblers before they reach a point of crisis" (Delfabbro et al., 2012, *pp.* 349). Findings from the current thesis indicate that higher levels of hope can protect at-risk individuals from increased gambling intensity and PG severity. As an example, programs which nurture hope have the potential to

protect at-risk individuals from PG, particularly if these programs nurture agentic thinking (e.g., teach methods that improve individuals' ability to remain motivated in the face of adversity). Moreover, findings from this thesis illustrate that among residents of deprived neighbourhoods (a population at heightened risk of engaging in maladaptive behaviours), those with higher levels of hope are more likely to seek help for gambling-related problems than those with lower levels of hope, which suggests that hope can also aid recovery (via seeking help) if problems were to emerge. Therefore, these findings suggest that fostering hope in at-risk populations can minimise the onset of PG and aid recovery in cases where problems have already emerged.

Studies have repeatedly found a relationship between neighbourhood deprivation and a range of addictive behaviours including PG (see Barnes et al., 2013; Wardle et al., 2014; Wardle et al., 2011). However, findings that hope can reduce gambling intensity and PG severity among residents of deprived neighbourhoods and the relatively deprived suggests that fostering hope among these populations can eliminate/reduce the onset of PG. Moreover, although future research is required to establish causality, findings that hope is positively correlated with help-seeking intentions suggests that fostering hope may also encourage individuals to seek help if problems emerge (or have already emerged). While hope can be fostered via structured programs and counselling (see Bouwkamp & Lopez, 2001; Edwards & Lopez, 2000; Pedrottio, 2000), it may be more valuable to rely on alternative ways of fostering hope among at-risk populations as at-risk individuals are often reluctant to (a) attend counselling or (b) engage with the session(s) when they do attend (see Dryden & Reeves, 2008). For instance, although there is a need to establish causality in future research, findings from Chapter 5 reveal that good quality sleep and nutritional habits are associated with higher levels of hope. Therefore, if future research is able to establish causality, charities and

governmental bodies have another reason to devise ways to encourage healthier nutritional and sleep habits.

One way in which governmental bodies and charities can encourage healthier habits is to send fruit and vegetable vouchers, post leaflets explaining the benefits of healthier nutritional and sleep habits, and how these could be achieved. This may in turn make for positive prevention and intervention, that is, healthier nutritional habits and sleep may reduce the likelihood of PG (directly or indirectly). In support of this approach, one study found that low-income women who received vouchers for fresh fruit and vegetable purchase used the supplements provided almost fully (Herman, Harrison & Jenks, 2006). There is also evidence that incentivising fruit and vegetable purchase can increase purchases of fruits and vegetables (Andreyeva & Luedicke, 2015). As for improving sleep quality, findings reveal that educational leaflets can be an effective means of encouraging healthier sleep (Bakotic, Radosevic-Vidacek & Koscec, 2009). In short, using methods that encourage healthier nutritional and sleep habits can be advantageous among at-risk populations (i.e., residents of deprived neighbourhoods) as results from Chapter 5 indicate that both good quality sleep and nutritional habits are directly (bypassing hope) and indirectly (mediated by hope) related to reduced PG severity, thus measures taken to encourage these habits may prevent the onset of PG.

Overall, this thesis offered an explanation for the inconsistencies reported in the gambling literature and in so doing provided further evidence for claims that there are two subtypes of gamblers. Second, in this thesis evidence was provided in support of the notion that hope, a psychological construct rooted in Positive Psychology, can serve as a buffer against increased gambling intensity and PG severity among populations who resemble escape-seekers (the

subtype of gamblers most vulnerable to PG). Third, a relationship between sleep quality, nutritional intake, hope and PG severity was found, which can be particularly valuable if future research discovers that nutritional habits and sleep quality *cause* changes in hope levels or PG severity. Finally, findings demonstrate a positive correlation between hope and help-seeking intentions among residents of deprived neighbourhoods, a population who are often reluctant to seek help. This is particularly advantageous as it suggests that as well as making for positive prevention and intervention, hope may also aid recovery processes if problems emerge (again, future research is required to establish causality).

To conclude, findings from this thesis showed for the first time that hope can protect at-risk individuals from increased gambling intensity and PG severity and is likely to aid recovery processes (via help-seeking) if gambling-related problems emerge. Therefore, one can hope that scholars and policy makers extend these findings and examine some of the real-world implications discussed above. Moreover, scholars are encouraged to also examine whether hope can protect at-risk individuals from engaging in other addictive behaviours (i.e., binge eating and compulsive buying). This is particularly valuable as findings in the addiction literature indicate that coping motives are associated with a range of addictive behaviours (e.g., Birch et al., 2006; Cooper et al., 1992), and generally cause "greater overall addiction severity" (Stewart et al., 2008, *pp*. 266).

7 References

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8 Appendices

Appendix A: Short Questionnaire to Collect Data on Age and Gender

1. **Age:**

2. **Gender:**

- Male
- Female
- Prefer not to say

Appendix B: Task-Comprehension Questionnaire

1. How many points could you potentially win if you bet 10 points on 10/1 odds?

    - 10 points
    - 100 points
    - 110 points

2. When placing a bet, selecting which of the following odds will lead to a better chance of winning?

    - 20/1 odds
    - 10/1 odds
    - 5/1 odds

Please ask the experimenter whether (or not) your answers to questions 1 and 2 are correct before completing questions 3 and 4.

3. How many points could you potentially win if you bet 10 points on 5/1 odds?

    - 10 points
    - 50 points
    - 60 points

4. When placing a bet, selecting which of the following odds is the riskiest option (higher chance of losing)?

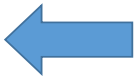
    - 20/1 odds
    - 10/1 odds
    - 5/1 odds

Appendix C: Experimental Manipulation to Induce Feelings of Relative Deprivation

Name: Participant's name **CDI Index Score:** 157

Your CDI index score was derived from statistical analyses using both the information from the online questionnaire you completed and the information in our database from people who matched your profile. From your CDI index score, we were able to figure out how deprived/privileged you are in comparison to similar others (i.e., similar age, gender, etc.) using the scale below; the scale below points to the range your CDI index score falls within.

CDI Scale	Relative Comparative Discretionary Income Index
-201 to -∞	Extremely Deprived
-101 to -200	Deprived
-1 to -100	Relatively Deprived
0	Average
1 to 100	Relatively Privileged
101 to 200	Privileged
201 to ∞	Extremely Privileged



Appendix C: Experimental Manipulation to Induce Feelings of Relative Privilege

Name: Participant's name **CDI Index Score:** 57

Your CDI index score was derived from statistical analyses using both the information from the online questionnaire you completed and the information in our database from people who matched your profile. From your CDI index score, we were able to figure out how deprived/privileged you are in comparison to similar others (i.e., similar age, gender, etc.) using the scale below; the scale below points to the range your CDI index score falls within.

CDI Scale	Relative Comparative Discretionary Income Index
-201 to -∞	Extremely Deprived
-101 to -200	Deprived
-1 to -100	Relatively Deprived
0	Average
1 to 100	Relatively Privileged
101 to 200	Privileged
201 to ∞	Extremely Privileged

Appendix D: Invitation Letter Used to Advertise Study 1

University of East Anglia

School of Psychology

Invitation Letter

Investigating Gambling Correlates

Dear Sir/Madam,

I am a current PhD candidate studying the possible correlates of gambling. I have recently advertised one questionnaire study (advertise link here) that aims to explore several potential correlates of gambling; if you have gambled at least once in the last 12 months, could you please spare some time to complete the questionnaire. This questionnaire will take approximately 15 minutes to complete.

Please note:

1. **You must be 18 or over to complete the questionnaire.**
2. **All information which you provide during the study will be stored in accordance with the 2018 Data Protection Act and kept strictly confidential.**
3. **Your participation is voluntary and you are free to withdraw at any time without giving any reason and without it affecting you at all. However, it is not possible to withdraw your responses once submitted as it is not possible to identify you.**

Thank you for taking the time to read this invitation letter; it would be awesome if you could complete this questionnaire.

Yours sincerely,
Shahriar Keshavarz
PhD Candidate
School of Psychology
Lawrence Stenhouse building
University of East Anglia
Norwich Research Park
Norwich
NR4 7TJ
S.Keshavarz@uea.ac.uk

Appendix E: Invitation Letter Used to Advertise Study 2

University of East Anglia

School of Psychology

Invitation Letter

Investigating Gambling Correlates

Dear Sir/Madam,

I am a current PhD candidate studying the possible correlates of gambling. I have recently advertised one questionnaire study (advertise link here) that aims to explore several potential correlates of gambling; if you have gambled at least once in the last 12 months, could you please spare some time to complete the questionnaire. This questionnaire will take approximately 15 minutes to complete.

Please note:

1. **You must be 18 or over and reside in England to complete the questionnaire.**
2. **All information which you provide during the study will be stored in accordance with the 2018 Data Protection Act and kept strictly confidential.**
3. **Your participation is voluntary and you are free to withdraw at any time without giving any reason and without it affecting you at all. However, it is not possible to withdraw your responses once submitted as it is not possible to identify you.**

Thank you for taking the time to read this invitation letter; it would be awesome if you could complete this questionnaire.

Yours sincerely,
Shahriar Keshavarz
PhD Candidate
School of Psychology
Lawrence Stenhouse building
University of East Anglia
Norwich Research Park
Norwich
NR4 7TJ
S.Keshavarz@uea.ac.uk

Appendix F: Invitation Letter Used to Advertise Study 3

University of East Anglia

School of Psychology

Invitation Letter

Investigating Correlates of Help Seeking

Dear Sir/Madam,

I am a current PhD candidate studying the possible correlates of help seeking. I have recently advertised one questionnaire study (advertise link here) that aims to explore several potential correlates of help seeking; could you please spare some time to complete the questionnaire. This questionnaire will take approximately 15 minutes to complete.

Please note:

1. **You must be 18 or over and reside in England to complete the questionnaire.**
2. **All information which you provide during the study will be stored in accordance with the 2018 Data Protection Act and kept strictly confidential.**
3. **Your participation is voluntary and you are free to withdraw at any time without giving any reason and without it affecting you at all. However, it is not possible to withdraw your responses once submitted as it is not possible to identify you.**

Thank you for taking the time to read this invitation letter; it would be awesome if you could complete this questionnaire.

Yours sincerely,
Shahriar Keshavarz
PhD Candidate
School of Psychology
Lawrence Stenhouse building
University of East Anglia
Norwich Research Park
Norwich
NR4 7TJ
S.Keshavarz@uea.ac.uk